The Role of Self Regulatory Strength in the Expectancy-Value Model: Explaining Differences in Academic Effort as a Function of Race and Class

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Social Work and Psychology)
in the University of Michigan
2015

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Acknowledgements

I would like to express my sincere gratitude to my dissertation committee members, Dr. Kai Cortina, Dr. Sandra Danziger, Dr. Jacqueline Eccles and Dr. Trina Shanks for their guidance, feedback and support throughout the dissertation process. I am especially thankful for Dr. Cortina's assistance with running my statistical analyses, and with Dr. Danziger's guidance on navigating the sociological literature on the achievement gap.

I would also like to thank the members of the Socioeconomic, Ethnicity and Development Lab, including Dr. Vonnie McLoyd, for giving me the opportunity to vet ideas in her lab and for being a supportive mentor throughout the process, Dr. Sandra Tang, for providing me with helpful advice for running statistical analyses in MPlus, and Dr. Grace Yang, for keeping me company in the lab and providing encouragement.

I would also like to extend my gratitude to Dr. Lorraine Gutierrez, who has not only served as my advisor during graduate school, but during my undergraduate career as well. Her positive attitude and consistent support has helped me to believe in myself and given me the courage to pursue and maintain the path of a doctoral education. I would not have made it this far without her.

Additionally, I would like to thank my parents for fostering a sense of both academic expectancy and value in me from a young age, and for giving me the best academic opportunities they could afford. They were wise beyond their young years when it came to investing in early childhood education, and this no doubt was the springboard for my academic trajectory.

I would also like to thank my husband for his consistent emotional and financial support during my doctoral studies. He has lightened my load and brightened my days. His witty sense of humor and willingness to take on more than his share of housekeeping and child-rearing has kept me from depleting my self-regulatory strength during the dissertation-writing process, and I would not have been able to complete this journey without him by my side.

Finally, I would like to thank my son for bringing me unspeakable joy and an increased sense of purpose in my life. Much like his father, his sense of humor brings a smile to my face and serves as much-needed comic relief. This dissertation is dedicated to you and Baby #2, who is kicking me as I write this. I hope that my journey serves as motivation for each of you to believe in yourselves and pursue your dreams.

Table of Contents

List of Figures

List of Tables

Abstract

The gap in achievement between low-income and minority youth and their higher-income and European American counterparts is a pressing issue in the United States, with severe consequences for the economic health of our nation. While a great deal of research has been conducted over the past several decades in an effort to understand and eliminate this gap, it has remained stubbornly persistent.

A variety of theoretical explanations have emerged from this research, many of which address multiple barriers to education that poor and minority youth face. In particular, the expectancy-value model of achievement motivation reconciles both distal, macro-level precursors to achievement by linking them to what are thought to be the most proximal, motivational precursors to achievement – expectancy of success and value of the task at hand. Although this model has shown promise in predicting achievement outcomes, it does not account for differences by race or class, as low-income and minority youth report levels of expectancy and value that are as high or higher than their higher-income and European-American counterparts.

In light of this discrepancy, I have suggested that a third variable – self-regulatory strength – may be needed to "catalyze" these motivational intentions into effortful action when tasks are valued primarily for their utility. Furthermore, I hypothesized that levels of self-regulatory strength may be lower in at-risk populations due to the strains associated with poverty and racism.

Using the Child Development Supplement survey of the Panel Study for Income Dynamics, this dissertation explores whether inclusion of an interaction between self-regulatory strength and utility value in the expectancy-value model of achievement motivation explains differences in homework completion tendencies. In addition, I examine whether self-regulatory strength mediates a relationship between parental warmth and homework completion.

Results indicate that there were main effects for expectancy and self-regulatory strength, but inclusion of these variables did not attenuate the disparities in homework completion. The effects of an interaction between self-regulatory strength and utility value remain unclear, as the nature of the relationship differed across math and reading. Finally, parental warmth appears to indirectly impact homework completion via self-regulatory strength. Implications for practice and policy are discussed.

Chapter 1: Introduction

"Quality public education is the **civil rights issue** of our generation."
-Arne Duncan, U.S. Secretary of Education

The "achievement gap" in the United States, which refers to the persistent inequities in academic opportunities and corresponding inequality in achievement between youth of color and youth from low socioeconomic status backgrounds, and their European-American and higher socioeconomic status counterparts, is no doubt one of the most pressing issues of our time. In the United States, race and poverty are highly related, such that youth of color (i.e. Black and Hispanic) are significantly more likely to be low-income than youth of European descent (United States Census Bureau, 2009), and this makes it difficult to dissociate effects of race from socioeconomic status. The large disparities between both socioeconomic and ethnic groups manifests itself early in the lifespan, in a variety of measures and across a variety of domains, even after controlling for other factors such as parents' education levels (Jencks & Phillips, 1998).

The consequences associated with low educational achievement for both the individuals who experience it, as well as for society as a whole, are severe. On an individual level, low achievement is related to low future earnings. Data from the Bureau of Labor Statistics (2010c) confirm that, not only is more education associated with higher earnings, but also with higher job security. For instance, in 2009 those without a high school diploma experienced unemployment at a rate of 14.6 percent, and those who were employed earned a median weekly income of $454.

Comparatively, those with bachelor's degrees experienced a jobless rate of 5.2 percent with a median weekly income more than twice as large, at $1,025.

Given its relationship with employment and earnings, level of education is obviously related to adult poverty status as well. The most recent data made available by the Census Bureau's 2009 American Community Survey indicates that, among European Americans, about 22.4 percent without a high school diploma were living below the poverty threshold. Conversely, only 11.8 percent of high school graduates and 4 percent of college graduates, defined as those with a bachelor's degree or higher, were living in poverty (United States Census Bureau, 2010). Among African Americans, 36.7 percent of those without high school diplomas were living in poverty, compared to 24.6 percent of high school graduates and 7.1 percent of college graduates (United States Census Bureau, 2010). In sum, the achievement gaps experienced by youth are directly related to income gaps and poverty status in adulthood, which in turn are predictive of quality-of-life issues. Thus, one of the implications of the achievement gap is ethical in nature, as those who experience the lowest levels of achievement are often condemned to later poverty and the socially unjust conditions with which it is associated (Holzer, Whitmore Schanzerback, & Duncan, 2007).

Further exacerbating this issue is the evolution of our national economy from one based primarily in production of goods to one based increasingly in services and technology. While the nature of the education-earnings relationship makes sense intuitively – employers who require more precise skills and training must pay higher salaries in order to incentivize that investment in education – there have historically been exceptions to this general trend such that workers in some industries – the automotive, steel and construction to name a few – could make upper-middle class wages with little or no formal education (Bureau of Labor Statistics, 2009; Bureau

of Labor Statistics 2010a, Bureau of Labor Statistics 2010b). However, projections for future job growth continue to be in such fields as technology and healthcare – fields that rely on a college-educated workforce (Bartsch, 2009). Given these trends, the negative consequences of low academic achievement in the United States are becoming increasingly severe.

The implications of the achievement gap and subsequent employment and earnings gaps are not limited to those individuals who are directly affected by poverty – the issue impacts our national economy as a whole. For instance, research conducted by Holzer and colleagues (2007) suggests that the cost associated with poverty and low achievement among youth is an astounding $500 billion annually – or about 4 percent of GDP. These costs are incurred primarily through lost earnings, higher crime, and poorer health outcomes among those living in poverty.

One can begin to see the cyclical pattern of poor academic achievement and poverty, and how the social reproduction of class is maintained across generations. The fact that, in the United States, educational attainment is related to family background is incongruent with core values of our society. Understanding the nature of the achievement gap is the first step in any attempt to alleviate it. Indeed, social scientists have identified a number of factors associated with variation in achievement, noting that they are often intertwined, co-occurring and transactional in nature.

Chapter 2: Literature Review

Academic Achievement

Before delving into the antecedents of academic achievement, it is useful to articulate what is actually meant by academic achievement. There have been four primary ways in which "achievement" has been operationally defined in the education literature – grades (e.g. Duckworth, Tsukayama & May, 2010; Heard, 2007), standardized test scores such as the Woodcock-Johnson (e.g. Breslau, Breslau, Miller, & Raykov, 2011), level of participation in optional advanced courses – (e.g. Updegraff, Eccles, Barber & O'Brien, 1996) and years of schooling or completion of meaningful thresholds of academic attainment such as graduation from high school or college (e.g. Beal & Crockett, 2010). Grades are generally measured for individual classes or as a composite grade point average for all classes combined. Grade point averages in particular are high on ecological validity – or the extent to which a measure has real-world applicability. They represent the ability of a student to translate cognitive competencies and knowledge into achievement outcomes or performance (Heard, 2007) and are one of the primary indicators that universities use in the admissions process. As such, they are important indicators to which researchers should attend.

However, grades can also be highly subjective, as they depend in large part on individual teachers' ratings, which may vary within teacher and most certainly do across teachers. For instance, one source of error may be in how grades are administered on a within-school or within-class normative fashion (e.g. an "A" in a school with comparatively low performance standards is not equal to an "A" in a more rigorous school with higher performance standards).

Additionally, it is also possible that teachers may grade differentially by race and class (either subconsciously or consciously), and this bias in turn could partially explain differences in achievement. In either case, the lack of standardization of this measure of academic achievement, makes both across-group (SES and/or ethnicity) and across-school or even across-classroom comparisons difficult.

On the other hand, standardized test scores can allow for more accurate comparisons between students, particularly across classes and schools, as they are not as prone to teacher bias. The downside is that they may not accurately measure *mastery* of content, as one may be able to "teach to the test" – essentially helping students practice specific test questions rather than helping them master broad concepts. Furthermore, standardized test scores do not account for student *effort* to the extent that grades do, since grades are generally based on the accumulated completion of multiple assignments. In other words, children and adolescents who have high test scores may still have low grades because of a failure to sustain the effort necessary for consistently studying and completing class assignments. As such, standardized test scores may be a better reflection of *current understanding, knowledge acquisition, or ability* rather than *academic achievement,* because the measure does not reflect the *performance* component of achievement, a concept that will be further discussed in the section addressing determinants of achievement.

Choice of classes is another measure of academic achievement that is high on ecological validity. Specifically, enrollment in classes that are viewed as being "college track" do in fact have implications for the college admissions process. These courses include core courses such as upper-level math, English and science, as opposed to art or physical education electives, for example. Enrollment in advanced placement courses is also viewed as being associated with

higher academic achievement. One major pitfall of using choice of class as a definition of achievement, however, is that one may choose advanced courses and still perform poorly in them.

Finally, years of school completed has been used as a measure of academic achievement, such that more school is associated with higher academic achievement. Such measures are often based on a single item in which various levels of education benchmarks are assessed, ranging from "less than high school graduation" up to "doctorate." Such measures are strongly associated with adult employment statistics and income. A downside to operationalizing academic achievement as number of years of school completed is that it cannot be assessed until late adolescence or adulthood, at which time asking respondents to recall relevant childhood experiences that may have contributed to current education levels may reduce the accurate measurement of antecedents. In other words, although this particular operationalization of academic achievement is highly sought, the tradeoff is often that the childhood variables, likely based on inaccurate recall, with which researchers may want to associate achievement may of a lower quality. Conversely, the use of long-term longitudinal data collection methods negates the potential pitfalls of using this operationalization, however such studies are expensive, usually result in some degree of attrition, and are relatively rare.

Regardless of how achievement is measured, the difference between low-SES compared to high-SES and African American and Hispanic compared to European American children is fairly consistent. Poor children and ethnic minority children score lower on preschool tests of expressive vocabulary and counting, score lower on standardized assessments of reading and math from the elementary to the secondary school years, are more likely to be held back, less likely to graduate, and less likely to enroll in college and graduate once enrolled (National Center for Education Statistics, 2003b; 2009b). In order to understand why this is the case then, one

must look into what factors impact achievement, and how and why known determinants of achievement may vary systematically as a function of race and SES.

Theoretical Frameworks for Organizing Research on Determinants of Achievement

A large body of literature pertaining to the achievement gap has accumulated in the fields of sociology, psychology, education, anthropology and economics. Several overarching paradigms, theories and models have been described as possible explanations for the achievement gap as a function of race and class, ranging from broad structural influences at the societal level to psychological and behavioral influences on the individual level. As Hallinan (2001) noted, debates between macro-level and micro-level explanations center around the tension between the discourses, which is primarily due to the implications that each explanation has for who is responsible for the problem – society or individuals. In other words, macro-level explanations imply that social structures serve to perpetuate differences in achievement by race and class (Carbonaro, 2005), whereas micro-level, psychological explanations imply that differences in achievement are due to individuals' behaviors.

There is an increasing recognition that these either/or debates between paradigms are overly simplistic (e.g. Wilson, 2010), and can be viewed as complementary and thus, reconcilable. In an effort to synthesize this array of theories in a complementary fashion, I draw upon two theories of human behavior in context to use as organizing frameworks: Bronfrenbrenner's Ecological Systems Theory (1989) and Bandura's Social Cognitive Theory (1989), because each of them places emphasis on the *interplay* between individuals and their environments.

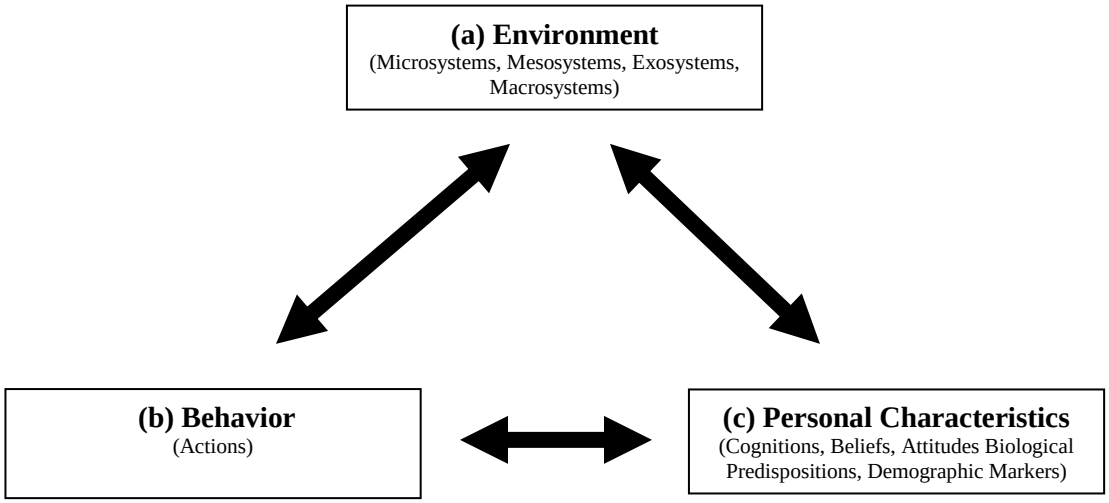
Bronfrenbrenner's Ecological Systems Theory (1989) postulates that individuals' behaviors at any point in time can be understood as a *joint* function of *genetic or innate*

predispositions and the *cumulative* impact of *environmental* factors over the course of one's lifespan. As such, trying to understand and thus change human behavior without considering all three of these factors simultaneously may result in inaccurate or misleading models of human behavior. Furthermore, this theory postulates that impact from the "environment" is not simply one's immediate contexts, but rather an interaction of several increasingly expansive systems in which each previous system is nested. These systems include microsystems, or immediate contexts in which interpersonal relationships occur (e.g. home, school); nested in mesosystems, which link microsystems together (e.g. mutually reinforcing home and school environments); nested in exosystems, or the broader contexts in which a person's microsystems are affected, but with which he or she is not directly interacting (e.g. census-tract neighborhoods, school districts), nested in macrosystems, which consists of the overarching patterns of norms, laws, customs, lifestyles, cultures and opportunity structures that ultimately affect the microsystem (e.g. social class, racism, educational values) nested finally in chronosystems, or the dimension of trajectories over time. The chronosystem embodies those contexts associated with developmental life course theory including exposure accumulation, change or consistency, and critical developmental periods (e.g. chronic versus acute poverty, impact of poor nutrition in early versus later years, etc.; Elder, 1998) Each of the environmental explanations for the achievement gap that will be discussed can be organized into one or more of these system categories, thus highlighting the scope of environmental impact on individuals' academic achievement-related cognitions and behaviors.

Bandura's Social Cognitive Theory (1989) is similar to Bronfenbrenner's paradigm (1989) in that it stresses the important role of environment in influencing human behavior. However, Bandura's theory differs slightly in that the role of *personal agency* is emphasized in the

paradigm, which allows for some degree of action that can be taken by an individual to shape his or her own environment as well. Social Cognitive Theory is grounded in a model of causation known as triadic reciprocal determinism, which focuses on the *reciprocal* interaction between a) environment b) behavior and c) personal characteristics, including cognitions, biological predispositions, and markers (both subtle and explicit) of one's "role" in society, such as race and gender. The idea of triadic reciprocal determinism is imperative to reconciling the social-causation versus social-selection theories of achievement disparities, as it recognizes the *bidirectional* nature of interactions between people and their environment (See Figure 1).

Figure 1. Model of Triadic Reciprocal Determinism



The interaction between personal characteristics and behavior (b ↔ c), for example, is such that personal beliefs, expectations, and affect influence one's behaviors (e.g. those who believe that they can successfully learn calculus will be more likely to take a calculus course than those who do not believe they can learn calculus). Conversely, the outcomes of said behaviors shape personal beliefs, expectations, values and affect (e.g. successful completion of a calculus assignment may confirm one's personal beliefs about one's ability to learn calculus and conversely, failure on a calculus assignment may also confirms one's personal beliefs about

one's inability to learn calculus). Likewise, the interaction between environment and personal characteristics (a ↔ c) is such that society imparts information that leads to the development of beliefs and expectancies, independent of what one has personally experienced, which is known as social learning (e.g. one may be socialized to believe that "people like me" such as minorities or women are not good at calculus, and infer that he or she is not good at calculus, regardless of one's own experience with it). Conversely, social roles to which one is assigned can often elicit reactions from those in one's environment that are equally independent of actual experience (e.g. in the beginning of the term, one's calculus teacher may assume that one will not perform well, not because the teacher has information on prior performance, but rather because one is a member of a stereotyped group that is thought to underperform in calculus, such as women or minorities). Finally, the interaction between environment and behavior (a ↔ b) is such that environmental factors shape behaviors, just as Bronfenbrenner (1989) described. However, Bandura (1989) asserts that individuals have at least some capacity to change (e.g. move from one neighborhood to another or start a new job), modify (e.g. start a neighborhood watch group to reduce crime or ask for a modified work schedule) or otherwise respond to (e.g. successfully cope with) their environment, and further, that aspects of the environment are *not influential until they are catalyzed by behavior*, stating, "Lecturers do not influence students unless they attend their classes, hot stove tops do not burn unless they are touched, parents usually do not praise their children unless they do something praiseworthy." (p. 3). In short, one's environment can respond to and be influenced by one's behavior, and the availability or presence of an environmental characteristic may not become manifest without a behavior partaken by an individual that "unleashes" said environmental characteristic. While Bronfenbrenner's theory

does not preclude this direction of causation (i.e. person → environment), it is clearly not emphasized to the degree that it is in Bandura's theory.

Keeping these theories in mind as a lens through which one can organize the theoretical and empirical literature on understanding the achievement gap, I first review those theoretical explanations that emphasize psychological explanations, including individuals' cognitions and behaviors. Then I review those theories that focus on the environmental contexts in which the children and youth exhibiting achievement deficits reside, including larger societal structures (macrosystem) down to smaller units of context such as families and classrooms (microsystems). Importantly, this separation of environmental and psychological theories is for organizational purposes only and is not intended to reflect a dichotomy between environmental and personal variables. On the contrary, this review is designed to synthesize the overlapping components of each of the theories.

Determinants of Achievement

Why do some people achieve academically while others do not? What are the "ingredients" that are needed to help youth achieve? There appear to be three necessary but individually insufficient components of academic success (Sorensen & Hallinan, 1977) – opportunity, ability and effort (see Figure 2). *Opportunity* refers to the exposure to cognitively stimulating environments and availability of resources that are conducive to learning, including learning toys during early child development and up-to-date books and other technologies during the school years. It also refers to the availability of support systems such as competent teachers who appropriately scaffold learning environments and parents who help their child understand homework assignments for example. Regardless of the intelligence and motivation of a child, he

or she is unlikely to learn much without being exposed to quality learning opportunities. Of the three components of academic success, this one is primarily external to oneself.

Ability refers to the cognitive ability necessary to understanding whatever concepts are being taught. That is, students must have both the intellectual capacity, or aptitude, as well as the prerequisite knowledge, or previous mastery, necessary to understand whatever new knowledge is being taught. For instance, even when the opportunity to take an advanced course arises, and a student is hard-working and willing to put in the effort, if the material being taught is beyond that student's zone of proximal development (ZPD), he or she is unlikely to be academically successful in that course (Vygotsky, 1978). To use a more concrete example, one is unlikely to be able to master Calculus if one has not yet learned Algebra. In terms of understanding differences in ability by race or class, one must recognize that ability at any period of time in a child's life is dependent not solely, or even primarily, on inherent intelligence (Duckworth & Seligman, 2005), but also on the accumulation of previous knowledge. As such, any disruption in previously described opportunities to knowledge exposure puts children at risk of having comparatively low ability in the future, unless remedial action is taken to help them "catch up" on the prerequisite knowledge for understanding the more advanced lesson. Indeed, as standardized test scores indicate, poor children and children of color lag behind their within-grade peers with respect to understanding and mastering concepts that are thought to be appropriate for their age groups (Hemphill, Vanneman, & Rahman, 2011; Vanneman, Hamilton, Anderson, 2009). Ability is internal to the self, but depends in part on external sources - previously available opportunities.

Finally, *effort* or *engagement* refers to the initiation and sustenance of action aimed at completing academic tasks (Kuh, 2001), or behaviors that are broadly representative of student

participation in learning, such as completing homework and being attentive in class (Johnson, Crosnoe, & Elder Jr, 2001). As implied by Bandura's (1989) assertion that many environmental characteristics must be catalyzed by individual behavior, the presence of learning opportunities and ability to learn, alone, *are not enough to result in high academic achievement or performance* – students must be able to actively attend to the opportunities to which they are exposed in order to understand and master the material, and they must also be able to demonstrate what they have learned. Carbonaro (2005) describes academic effort as a multi-dimensional construct, and distinguishes between three subtypes of academic effort, including a) rule-oriented, b) procedural and c) intellectual. *Rule-oriented effort* is characterized by the most basic compliance to school rules, such as attending classes and staying out of trouble. *Procedural effort* is comparatively more demanding, and is characterized by adherence to class-specific demands such as turning in assignments, taking tests, and participating in classroom activities. It is associated with quantity or frequency with which one meets academic demands. Finally, *intellectual effort* is characterized by the application of one's current cognitive abilities to understanding and mastering the content set forth in the class. As opposed to procedural effort, which is associated with quantity or frequency, intellectual effort is associated with quality. A student who expends more time and thought ensuring comprehension and correct responses is engaging in a higher level of intellectual effort. *Effort*, then, is the key ingredient that helps one translate knowledge opportunities and abilities into knowledge acquisition (i.e. paying attention to lectures, reading textbooks, asking questions) and, furthermore, translating knowledge *acquisition* to knowledge *demonstration* – or performance (i.e. completing homework assignments, taking one's time on a test and not simply rushing through it and subsequently getting good grades).

Figure 2: Collectively Necessary Determinants of Achievement

While there is a substantial amount of research on academic effort and the degree to which it predicts academic achievement, there is surprisingly little research that examines differences in effort as an explanation for differences in achievement by race and class (Johnson, Crosnoe, & Elder Jr., 2001). As such, the focus of this dissertation will be on understanding the proximal role of *effort or engagement* in explaining differences in academic achievement by SES and race, with a particular focus on the antecedents to effort or engagement.

Academic Effort and the Importance of Self-Regulated Learning

One dominant line of research that expands on the role of effort in learning and subsequent academic achievement is based on the paradigm of *self-regulated learning* (SRL). The literature on self-regulation in the field of psychology is rife with differences in definitions and conceptualizations of this general concept, as has been noted by several researchers (Dinsmore, Alexander & Loughlin, 2008; Duckworth and Kern, 2011; Schunk, 2008). In particular, depending on the area of psychology, the term "self-regulation" has been used interchangeably with terms such as "metacognition", "self-regulation", "self-regulated learning",

"self-control", "volitional control", "action control", "volitional action", "impulse control" "self-discipline" or "inhibitory control" among others (Duckworth and Kern, 2011). As such, before delving into the research on self-regulated learning specifically, I will briefly highlight some perspectives on distinctions, similarities, and hierarchical relationships between the more generalized constructs that are not specific to learning, before returning to academically-oriented variations of these constructs.

Overview of general self regulation, executive functions, impulse control, and delay of gratification. The term "self-regulation" has been conceptualized in the broadest sense as goal-directed behavior (Hofmann, Schmeichel, & Baddeley, 2012). The term "executive functions" (EF) has been conceptualized in a variety of different ways, although a common theme in these conceptualizations is that it is an umbrella term that encompasses a fairly broad array of higher order cognitive capacities needed to undertake advanced goal-directed behavior (Barkley, 2001). Examples of such capacities include working memory, planning, inhibition, strategy development, self-maintenance and monitoring of actions and their associated outcomes, metacognition and flexibility in adapting these functions to meet goal standards (Bernier, Carlson, & Whipple, 2010; Denckla, 1994; 1996; Dennis, 1991; Garon, Bryson, & Smith, 2008; Hughes, 2002; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000; Morris, 1996; Spreen, Risse, & Edgell, 1995; Zelazo, Carter, Reznick, & Frye, 1997). What appears to make these seemingly disparate capacities related is that the neural origins that make each of them possible reside in the frontal lobes of the brain, and covary in part to the degree of development of this structure (Bernier et al., 2010; Miyake et al., 2000; Stuss and Benson, 1986). A useful way to distinguish between general self-regulation and executive functions is to conceptualize the

former as encompassing the process of goal-directed behavior, and the latter encompassing the variety of capacities needed to successfully carry out this process.

Having made that distinction, it is worth noting that in some cases researchers have explicitly defined self-regulation much more narrowly as one's adaptation of behaviors to situational demands, and in particular to the "overriding" of urges or impulses to make room for more instrumental behavior (e.g. Baumeister & Vohs, 2007, Magen & Gross, 2010). However, others have clarified that the overriding of urges or impulses is better described as "self-control" or "impulse control", making clear that such capacities are a subset of those required for self-regulation (Hofmann et al., 2012). Specifically, self-control (impulse control) has been defined as "the exertion of control over the self, by the self" (Muraven & Baumeister, 2000, p. 247). This construct is thought to be multi-dimensional, manifesting itself in three primary forms – behavioral, or controlling one's actions, cognitive, or controlling one's attention and thoughts, and emotional self-regulation, or controlling one's feelings (Raffaelli, Crockett, & Shen, 2005). Evidence of self-control is manifest when people adhere to societal rules or expectations *rather than deferring to automatic or impulsive urges* (Barkley, 1997; Baumeister, Heatherton, & Tice, 1994; Hayes, 1989; Hayes, Gifford, & Ruckstuhl, 1996, Shallice & Burgess, 1993) and, from an evolutional standpoint, its purpose it to maximize one's long-term interests (Barkley, 1997; Kanfer & Karoly, 1972; Mischel, 1996; Muraven & Baumeister, 2000).

This can be distinguished from action control or volitional control, which are effortful actions (thinking, being, doing) that are carried out *without* the interference of an urge or impulse to do otherwise. Volitional control is defined simply as conscious action control. That is, the behavior or action alone does not determine whether it is evidence of self-control versus action-control/volitional control, but rather the context of the action taking place despite (for the former)

or without (for the latter) competing urges is what distinguishes one from the other. As Muraven and Baumeister (2000) note, "Many behaviors may be difficult and effortful but require minimal overriding or inhibiting of urges, behaviors, desires, or emotions. Hence, not all effortful behaviors are self-control behaviors" (p. 247).

Further narrowing the scope of self-regulatory constructs, general delay of gratification is a specific type of self control/impulse control that has been described by Mischel (1996) as one's preference for choosing more valuable but temporally distant rewards over less valuable but immediately gratifying rewards. What distinguishes this particular form of self control/impulse control from others is the focus on the behavior's relationship toward a future reward (gratification). For instance, someone may feel angry and have the urge to use violence toward another, but recognizing the potential downfalls (getting injured, going to jail) practices self-control and refrains from using violence. In this example, cognitions about the future do not involve any reward or belated gratification to incentivize the behavior, so it is not an example of delayed gratification. Conversely, someone may feel very hungry and have the urge to eat a donut for a snack, but recognizing that the future reward for eating well is an attractive physique (which, when accomplished, will be gratifying), also practices self-control and refrains from eating the donut. Because this latter example involves cognitions about a potential future *reward*, it represents the more narrow characteristics of the delay of gratification construct.

Metcalfe and Mischel (1999) proposed an underlying, dual-processing mechanism, which they refer to as the "hot/cool system" that explains the source of these tensions or motivational conflicts. The "cool" system is cognitive, complex, reflective, slow, emerges later in the course of human development, is moderated by stress and is controlled by the self. This system is what has helped humans adapt to social systems and culture over the course of evolution. In contrast,

the “hot” system is emotional, simple, reflexive, fast, develops early, or in many instances is already present at birth, is facilitated by stress and is controlled by stimulus. This is the system that controls our “natural tendencies” or impulses, which are also the result of evolutionary adaptations to the environment. The authors refer to the cool system as the “know” system and the hot system as the “go” system, and suggest that both have specific locations in the brain that house their neural networks (namely the hippocampus and amygdala, respectively). Importantly, each of these systems has been found to be associated with contextual characteristics of the environment that may either facilitate or hinder their activation. Clearly, the ability to self-regulate, or override impulses that are competing with conscious goals and desires, depends on the cool system having the upper hand over the hot system when the “clashing demands” described by Baumeister and Vohs (2007) occur (Heatherton & Wagner, 2011).

Being a result of the “cool system,” self-regulation is developed over time. Research has consistently found that self-regulation increases substantially from infancy to early childhood (ages 4-5 years or so) and from early childhood to middle childhood (ages 8-9 years or so) (Bronson, 2000; Raffaelli et al., 2005). Results of studies looking at the trajectory from middle childhood through adolescence and early adulthood have yielded less consistent conclusions however, with some finding that self-regulation continues to increase well into the second and third decades of life (Demetriou, 2000) and others finding that it tends to plateau and stabilize in middle childhood (Raffaelli et al., 2005).

There have been four primary ways in which self-regulation has been operationally defined and measured in the literature – executive function tasks, delay of gratification tasks, endurance/persistence tasks, and questionnaires. Executive function tasks are those tasks that are meant to assess the degree to which one’s higher-level cognitive processing overrides lower-

level cognitive processing. The class example is the Stroop Test, in which a participant is given a page with various colors written out in letters that are of different colors than the words actually being written (e.g. blue, yellow, green). They are then asked to identify the color of the letters making up the words, and to do so as quickly as possible. The lower-level, reflexive response (i.e. that governed by the "hot system") is to answer with the name of the written text, because reading words has become automatic and reflexive for literate individuals. In the example given, "blue", "yellow" and "green" represent the reflexive, and incorrect, response. The higher level, and correct, response (i.e. that governed by the "cool system") is to answer "red", "green", and "purple", respectively, which takes considerably more time and thought to ascertain, as one tries to override the brain's automatic tendency to read the words.

Delay of gratification tasks are those in which participants make choices between smaller, or less valuable rewards that are immediate, and larger, more valuable rewards that are more temporally distant. The classic prototypical example is illustrated in a series of studies conducted by Mischel and colleagues (e.g. Mischel & Baker, 1975; Mischel, Ebbesen & Zeiss, 1972), in which small children are given the choice between eating a single marshmallow right now, or having to wait a few minutes for two marshmallows. As some researchers have noted, most real life opportunities to delay gratification do not include *more of the same* reward becoming available later, but rather rewards that are often *qualitatively different* than the less valued, but more immediately available reward (Wulfert, Block, Santa Ana, Rodriguez, & Colsman, 2002). Variations of this task have been shown to have high convergent validity and also high predictive validity for a variety of outcomes, including academic achievement (Duckworth & Kern, 2011).

Endurance/persistence tasks are those that assess the degree of task intensity or duration, whether it is either physical (e.g. squeezing a hand grip, keeping one's hand submerged in ice

water) or cognitive (e.g. persisting at a difficult or unsolvable puzzle, completing a series of challenging math problems). Such tests of self-regulation have been typified in the work of Muraven, Baumeister and colleagues (e.g. Muraven, Tice, and Baumeister, 1998).

Finally, a variety of scales developed as composites of questionnaire items have been designed to tap into the self-regulation construct. These include scales such as the Questionnaire on Self-Regulation (Bandy & Moore, 2010) that have been developed with the primary purpose of assessing self-regulation, as well as those that have been created by pulling relevant items from broader scales, such as that created by Raffaelli & Colleagues (2005) from the Behavioral Problems Index (Peterson & Zill, 1986). Questionnaires that are specific to delay of gratification include the Q-sort method (Funder, Block & Block, 1989) the Deferment of Gratification Questionnaire (Ray & Najman, 1986) and the Multidimensional Delay of Gratification Scale (Ward, Perry, Woltz & Doolin, 1989) that ask respondents to choose which course of action they would likely take. As with task-oriented measures, questionnaire assessments of self-regulation – both self-reported and informant-reported – have been found to have both high convergent and predictive validity (Duckworth & Kern, 2011).

Notably, the first three types of measures assess the intensity or duration of discrete, singular acts of self-regulation, which can vary within individuals across time and contexts. Conversely, questionnaire measures assess one's self-regulatory *tendencies over time,* and therefore may predict one's propensity to self-regulate in any given circumstance, but do not measure actual self-regulation. However, questionnaire items that assess general tendencies to self-regulate may be more indicative of one's *underlying capacity to self-regulate*.

Emerging research has found evidence of differences in self-regulation delay of gratification as a function of both race/ethnicity (e.g.; Matthews, Kizzie, Rowley & Cortina,

2010; McClelland, Morrison, & Holmes, 2000; Raver, Blair & Willoughby, 2013) and socioeconomic status (Kishiyama, Boyce, Jimenez, Perry & Knight, 2009; Mezzacappa, 2004; Raver et al., 2013) with African American and low-income children and youth exhibiting lower levels of self-regulation and delay of gratification.

Having conceptually clarified the general psychological constructs of self-regulation, self-control, and delay of gratification, I will next turn to the literature that focuses on these concepts in academic contexts.

Self-regulated learning. Zimmerman (2001) acknowledges that the variety of individual SRL theories are different when it comes to the details, citing seven distinct theories that he asserts each represent a "sub-type" of SRL. These sub-types of SRL include operant, phenomenological, information processing, social cognitive, volitional, Vygotskian, and cognitive constructivist. Zimmerman (2008) has attempted to unify theories based on their commonalities, and defines self-regulated learning (SRL) as an umbrella term that essentially encompasses "the degree to which students are metacognitively, motivationally, and behaviorally *active* [emphasis my own] participants in their own learning process" (p. 167), or a student's "self-generated thoughts, feelings, and actions for attaining academic goals" (Zimmerman, 1998, p. 73). The three underlying assumptions of SRL theories are that 1) students have *personal agency* over their ability to learn, which is manifested in their use of metacognitive strategies; 2) students have *personal agency* over their learning environment, which is manifested in their selection and organization of their surroundings during times of study; and 3) students have *personal agency* in tailoring their instruction to their individual needs, which becomes manifest when students seek supplemental information from resources such as the Internet and helpful others (Zimmerman, 2001). Self regulated learning is viewed as a *proactive* process that students

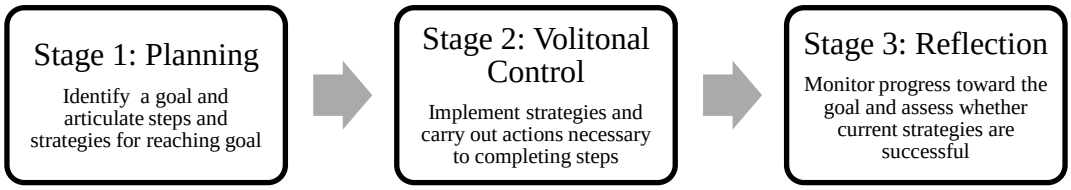
use to acquire academic skill, such as setting goals, selecting and deploying strategies, and self-monitoring one's effectiveness…" (Zimmerman, 2008 p. 166-167). In short, what self-regulated learning theories have in common is their emphasis on children's and adolescents' personal responsibility for their own learning. "Learning does not happen *to* a child – it happens *by* a child" (Zimmerman, 2001 p. 33).

The SRL process is thought to be ongoing and cyclical, with three distinct stages 1) forethought, 2) volitional control, and 3) reflection (Zimmerman, 2008; see Figure 3). *Forethought* is the stage that precedes action and includes goal-setting and planning. The *volitional control* stage is the action stage – the stage in which achievement intentions become realized in the behavior of the learner, and is synonymous with what is described in the previous section as the various types of academic effort. The *reflection* stage is the stage in which learners monitor and assess the progress of their goals and make judgments regarding the effectiveness of their strategies, changing them when they do not appear to be useful to achieving said goal.

For example, Susie has an upcoming math test. As a self-regulated learner, she first engages in the forethought stage, identifying a goal (get a 90% or better on the math test) and creating a plan of action to achieve said goal (step one: read math book, step two: take notes, step three: do practice problems to test understanding). Once she has done this, she enters the second stage, volitional control, and actually carries out the intentions articulated in the first stage, including reading her book, taking notes, and practicing math problems. Finally, she enters the self-reflection phase, in which she assesses her performance on the practice questions, comparing her answers to the corresponding practice answer sheet. She finds that she has only gotten fifty percent of her answers correct, and thus concludes that her learning strategies thus far (i.e. reading the book and taking notes) are not as effective as she had hoped. As such, she

supplements those strategies with another useful strategy – asking her older sister to help her clarify the math concepts. Then, the cycle repeats itself, with the exception that now planning and subsequent implementation includes new and different steps, namely asking her sister for help.

Figure 3: Self-Regulated Learning Process



Given the importance of strategy utilization in the SRL process, some researchers (e.g. Pintrich & De Groot, 1990; Weinstein & Mayer, 1986) have included "cognitive strategies" as a central component of SRL construct, concluding that, without knowledge of a variety of successful strategies to implement, the three-phase process may be fruitless. Indeed, the three most well known instruments for assessing SRL – the Learning and Study Strategies Inventory (LASSI; Weinstein, Sculte & Palmer, 1987), the Motivated Strategies for Learning Questionnaire (MLSQ; Pintrich, Smith, Garcia, & McKeachie, 1993) and the Self-Regulated Learning Interview Scale (SRLIS; Zimmerman & Martinez-Pons, 1986, 1988) – all seem to have a primary focus on assessing the number of different types of *strategies* students utilize while engaging in the highest form of effort – intellectual effort. Within the context of SRL, Corno (2001) has suggested that relevant self-control strategies that fall under the category of cognitive self-regulation include attention control, encoding control and information processing control.

Interestingly, a review of these various sub-types of SRL reveals that, with few exceptions (see Corno, 2001), the second stage in the SRL process – volitional control – has received significantly less attention in the self-regulated learning literature when compared to

either the planning or monitoring stages or the knowledge and use of strategies, despite the fact that the volitional control stage is arguably the most important to understanding differences in achievement, for reasons that have been discussed.

Academic delay of gratification. This definition of self-regulation illustrates why volitional control, and particularly self-regulation as a form of volitional control, is arguably the most important of the three stages of SRL. Anyone who has ever tried to break a bad habit, such as smoking, or start a good habit, such as exercising, knows that not all good intentions are successful, even when planning and monitoring (stages one and three) are being carried out. When trying to understand breakdowns in the SRL process, it is this second phase of volitional control that is often the "culprit". When self-regulation is the form of volitional control being used, there is an internal *struggle* that implies a degree of challenge in carrying out the task at hand. As many researchers of self-regulated learning have noted, consistently maintaining academically-oriented goal directed behavior – particularly that which is directed toward academic goals whose benefits, while valuable, may not be realized for months or even years – *often occurs in the context of competing alternatives* whose benefits, while immediately gratifying, are an impediment to future goals academic goals (Bembenutty & Karabenick, 2004; Pintrich, 1999; Randi and Corno, 2000; Sternberg & Williams, 2002). For instance, although one may know the importance of and have intentions to study for a test in order to perform well on it, one may also feel tempted to engage in more immediately gratifying or entertaining activities such as watching television or hanging out with a friend. To the extent that choosing to do the latter interferes with successful completion of the former, academic achievement is hindered. This suggests that the ability and propensity for students to delay gratification is an important precursor to academic achievement.

Bembennutty and Karebenick (1998) coined the term "academic delay of gratification" (ADOG), which is described as being similar to general delay of gratification, but situationally specific to academic contexts. Specifically, they have defined ADOG as students' postponement or willingness to postpone immediately available opportunities that satisfy impulses in favor of academic goals that are temporally distant yet presumably more valuable (Bembenutty & Karabenick, 1998; Bembenutty & Karabenick, 2004).

As is the case with other constructs related to self-regulation, conceptualization of ADOG has been much less clear. Pintrich (1999) highlights a lack of consensus among researchers on conceptualizing delay of gratification, noting uncertainty regarding its status as "a volitional strategy, a cognitive schema, a general disposition, or a personality trait" (p. 346). For instance, Mischel and colleagues (e.g. Mischel & Mischel, 1983; Mischel, Shoda, & Rodriguez, 1989) suggest general delay of gratification is an ability or competence that is developed over time and that also exhibits situational (contextual) variation. Conversely, Funder et al. (1989) suggest that it is a personality disposition that remains fairly stable over time. Bembenutty has conceptualized ADOG as a *strategy* one uses during the process of self-regulation, similar to other self-regulated learning strategies discussed previously (Bembenutty, 2007; 2009; Bembenutty & Karabenick, 1998; 2004). Bembenutty (2008) has also conceptualized ADOG as a "motivationally-determined choice between delay and non-delay alternatives" (p. 193).

I find Bembenutty's former conceptualization of ADOG as a *strategy* objectionable, primarily because the term "strategy" means a *plan* or *method* to obtain a goal, and delaying gratification is neither a plan nor a method, but rather a discrete, situationally-specific action that represents goal pursuit. It does not make sense conceptually to say that a strategy (plan, method) for obtaining a good grade in a course is to do the work upon which that grade is determined

instead of watching television or going to a party because such behavior is the essence of goal pursuit itself. Likewise, its role in the overall SRL process is clearly situated in the volitional control step, as opposed to the first step, which is planning. For this reason, when discussing academic delay of gratification from this point forward I use Bemembenutty's latter conceptualization of ADOG being a motivationally determined choice between delay and non-delay alternatives. Adding to Bembenutty's conceptualization, I suggest including the additional clarification that the choice is an *action* (and not simply an intention) associated with an outcome and emphasize that each instance of such choice of action is a *discrete* instance, even when a future goal is dependent on a series of such discrete actions.

Academic delay of gratification has historically been measured via a self-report questionnaire, appropriately named the Academic Delay of Gratification Scale (ADOGS; Bembenutty & Karabenick, 1998). This scale consists of ten items, each with two courses of action – one of which is academically oriented and one of which is meant to represent a more immediately gratifying impulse that college students would *typically* face, along with implications for those actions. Example items include "A) Go to a favorite concert, play or sporting event and study less for this course even though it may mean getting a lower grade on an exam you will take tomorrow OR B) Stay at home and study to increase your chances of getting a higher grade" and "A) Go to a party the night before a test for this course and study only if you have time OR B) Study first and party only if you have time". Response items include "definitely choose A", "probably choose A", "probably choose B" and "definitely choose B", where higher scores indicate higher academic delay of gratification.

By giving the respondent course-specific orthogonal choices from which he or she must choose, Bembenutty and Karabenick assert that this measure taps into how a student's delay of

gratification may vary across courses, thereby tapping into the situational specificity that effects within-person variation. Having said that, no studies to date have actually examined the within-person variation across courses. Instead, the score has been interpreted as a propensity (implying some degree of stability) to engage in academic delay of gratification. The flexibility in this interpretation highlights, similar to other psychological constructs, the importance of person-in-context explanations for behaviors, and may justify merging conceptualizations (i.e. ability, general disposition or situationally-specific action) of delay of gratification rather than suggesting that these potential origins are mutually exclusive.

One of the problems with measuring academic delay of gratification as a composite score based on responses to very specific scenarios (generally social or entertainment activities) is that these scenarios may not accurately reflect the variation in non-delay alternatives that are actually faced by students. For instance, a student who suffers from depression and lethargy may choose to sleep rather than to do school work, a scenario that is not reflected in the ten items. Similarly, a non-traditional student who has atypical obligations such as a job or children may choose to put off school work to get overtime pay or spend more time engaging with one's child. Indeed, low-income and African American college students are in fact more likely to be non-traditional students with obligations such as high-intensity employment and children (Engle & Tinto, 2008; Rawlston-Wilson, Saavedra, & Chauhan, 2014). As such, by focusing on non-delay activities that are faced by "typical" college students, this measure may fail to capture academic delay of gratification (or a lack thereof) among such samples and lead to misleading conclusions regarding the relationship between ADOG and achievement outcomes among certain samples.

Having explored the relationship between this measure of ADOG and other constructs thought to represent various other facets of self-regulated learning and predictors of academic

achievement, Bembenutty and Karebenick (1998) found ADOG to be related to students' use of self-regulated learning strategies such as rehearsal, elaboration, planning, monitoring, help-seeking, scheduling of time, avoidance of possible distractions, and expected grades. They also found that females exhibit higher levels of ADOG than males and that, compared to Caucasions (M = 2.8), non-Caucasians (a single group of students who identify as African-American, Asian-American, Hispanic, Native American and "other"), exhibited higher levels of ADOG at the college level (M = 2.9; Bembenutty, 1998). However, another study conducted by Bembenutty (2007) found that minority college students had lower final course grades than Caucasian college students and that the relationship between ADOG and final course grades was significant for Caucasian students, but not minority students. In short, higher scores on the ADOG scale were not associated with higher course grades for minority students, as one would expect. This could be reflective of the previous critique of the scale, insofar as minority students may experience different delay alternatives than those specified in the scale, which may lead to artificially inflated ADOG scores.

In an effort to formulate a comprehensive model that explains achievement differences then, understanding the multi-level determinants of self-regulation in the context of academic effort is in order.

Psychological Determinants of Self-Regulation and Academic Achievement – Overview of the Expectancy Value Model of Motivated Behavior

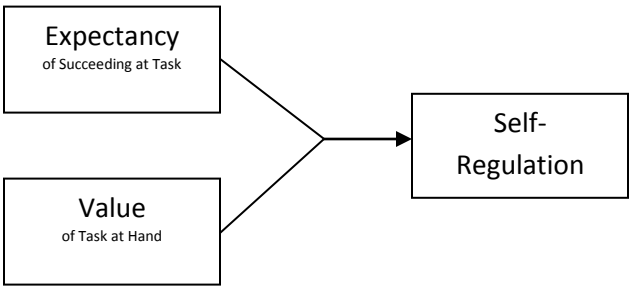
Why do people exert effort for the same goal at some times but not others? Similarly, why do some people exert effort for certain things, whereas others do not? More specifically, what causes variation in student engagement, or the effort to achieve academically? A popular theory of human motivation is the expectancy-value model. A variety of expectancy-value

models of human action exist and are utilized in a variety of social sciences, from economics to psychology (e.g. Fishbein; 1963; Mitchell and Biglan, 1971, Vroom, 1964). While they vary in details, they are all similar in that they postulate that goal pursuit (effort) is essentially the outcome of a combination of self-assessing 1) the likelihood that one can successfully attain the goal (expectancy) and 2) the costs and benefits associated with attaining the goal (value; Eccles, 1983; Nickerson & McClelland, 1989). The presence of either of these factors alone is insufficient – it is the combination of both high expectancy and high value that precedes goal pursuit. This can be represented by the following equation:

Expectancy * Value = Motivation to Self-Regulate

Figure 4 illustrates this model in is simplest form.

Figure 4: Basic Expectancy-Value Model of Self-Regulation

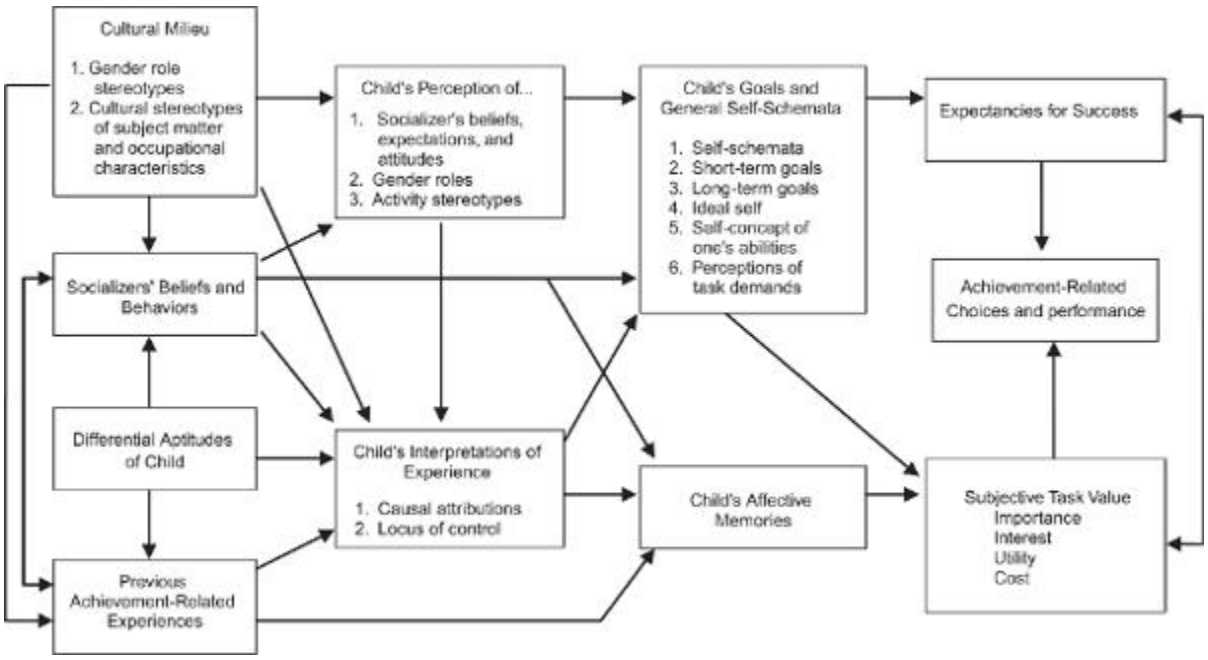


Within the field of educational psychology, the theoretical development of an expectancy-value model of achievement motivation has its roots in a model first introduced by Atkinson (1957, 1964, 1966). His model included both expectancy of success on a task and value of the task, in addition to a third determinant he called the "achievement motive", which he conceptualized as a stable trait or tendency to successfully pursue goals, as precursors of choice of achievement activities, persistence, and resulting performance. Furthermore, Atkinson initially posited that expectancies and values were inversely related, such that tasks perceived as having a lower expectancy for success (i.e. those perceived as difficult) would simultaneously perceived

as being more highly valued. As such, given the multiplicative relationship between the two constructs, the model indicates that an individual's maximum motivation for self-regulation would occur when tasks exhibit perceptions of moderate (.5) expectations for success and moderate (.5) value, as their product (.25) is the highest possible combination of the inverses.

Eccles and colleagues (1983) have since made great strides in building on this basic model, articulating a more contextually-inclusive model that has been tested extensively in real-world classroom situations (see Figure 5). Specifically, the model has been updated to include more nuanced dimensions and definitions of value (attainment, intrinsic, utility and cost), as well as the sociocognitive precursors of both expectancy and value, while Atkinson's "achievement motive" has been excluded. Furthermore, in contrast to Atkinson's theory, Eccles' model postulates a positive, rather than an inverse, relation between expectancy and value – a relationship that is supported by empirical findings (Battle, 1966; Crandall, Katkovsky & Preston, 1962). Figure 5 illustrates the most recent articulation of the modern expectancy-value model of achievement motivation (Eccles & Wigfield, 2002), the primary components of which will be discussed in more detail.

Figure 5: Expectancy-Value Model of Achievement Motivation



The Expectancy Construct. The expectancy construct is generally measured by assessing how well one thinks one will do on an *upcoming* task (i.e. in the future), which is conceptually disctinct from the perceived ability construct, or one's belief about current ability (i.e. in the present; Wigfield & Eccles, 2000). The expectancy construct, as defined in this model, has been measured, for example, by asking "how well do you think you will do in math next year?" Comparatively, measures of current ability are assessed by asking more general, domain-level questions such as "how good are you at math?" (Wigfield & Eccles, 2000). Having noted the theoretical distinction between these two constructs, Eccles and Wigfield (1995) conceded that such a distinction between expectancy and perceived ability has not been made apparent in the empirical evidence, likely because one's perceived current ability informs self-assessed probabilities of success in future attempts. In terms of explaining motivation to control one's volition and complete a task, those who do not believe that they are capable of succeeding in task

completion will not even try to do so, probably because it is viewed as a waste of one's resources to expend energy on fruitless pursuits.

The expectancy construct described in Eccles' and colleagues' model (1983) is conceptually similar to Bandura's (1977) definition of *efficacy expectations,* which are beliefs about one's ability to successfully carry out the behaviors that necessarily precede the outcome (i.e. "I think that I am capable of taking good notes and studying hard enough to pass the calculus exam"; Wigfield & Eccles, 2000). Bandura, however, maintained that efficacy expectations are only one component of the larger *expectancy* construct, noting that *outcome expectations*, or beliefs about the degree to which certain behaviors will lead to certain outcomes (i.e. "If I do well in school now, the outcome will be that I will get a good job later") are also important determinants of overall *expectancy*. Eccles and Wigfield (2002) have acknowledged that they have not formally included *outcome expectations* in their model, however its presence is implicit in measures of utility value of tasks, which will be further clarified in the discussion of the value construct.

What causes one to experience high expectancies or self-efficacy? In Eccles' model, perceptions of competence and of task difficulty precede expectancy, perceptions that are themselves preceded by perceptions of important others' (parents' and teachers') beliefs about expectancies and interpretations of previous performance outcomes. Similarly, Bandura (1977) asserted that beliefs about self-efficacy come from four primary sources, including 1) previous accomplishments (I did well in previous math courses, so I believe that I can do well in my current calculus course), 2) vicarious experiences (my father/sister/neighbor/best friend/important "other" with whom I can identify was able to understand and do well in calculus, so I believe I can as well), 3) verbal persuasion (my teacher keeps telling me I can understand

calculus, so I believe that I can do so) and/or 4) physical and affective reactions (I can easily understand and comprehend my calculus instruction with little or no anxiety or stress, therefore I infer that I must be "good" at it). In addition to these four influences on efficacy beliefs, it has been suggested that a fifth influence is imagining oneself succeeding in hypothetical situations (Maddux & Gosselin, 2003). Thus, consistent with Eccles' model, important others can influence child expectancies both directly, by serving as models of vicarious experience and verbally persuading them, as well as indirectly, through influencing interpretations of a child's own previous accomplishments.

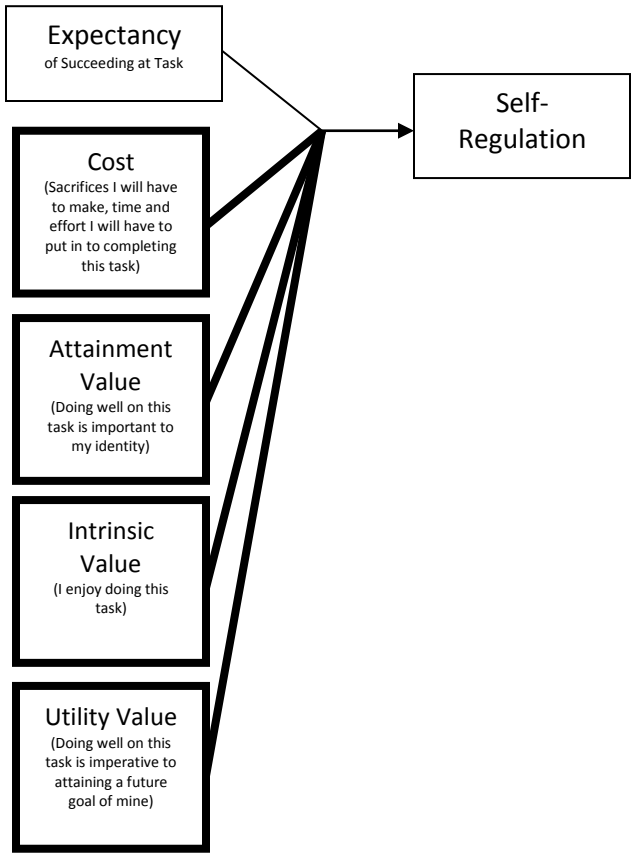
Given the role of previous performance in influencing expectancy, it is no surprise from a developmental standpoint then that pre-school and early-elementary age children initially report high expectancy for task success. Indeed, Wigfield and Eccles (1992) noted that very young children continue to exhibit such optimism in the face of repeated failure of tasks, which suggest that perhaps their reports of expectancy are more reflective of desired outcomes rather than previous performance. However, children's assessments of competence become distinguishable across domains such as academic and social (Harter, 1982), and even across academic domains such as math, reading and music (Eccles, Wigfield, Harold, & Blumenfeld, 1993), in the very early elementary years. Accurate assessments of expectancy do not appear to develop until a short time later in the middle elementary years when reports of expectancy begin to more consistently correspond to previous academic performance (Eccles, Midgley, & Adler, 1984, Stipek, 1984). Furthermore, studies indicate that there tends to be a pattern of consistent mean-level decline in expectancy through the elementary and middle school years in both academic and athletic domains (Eccles et al., 1989; Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991).

The Value Construct. In Eccles' and colleagues' (1983) model, the value construct is comprised of four subtypes of value – 1) attainment value, 2) intrinsic value, 3) utility value and 4) cost – all of which collectively influence the overall value assigned to any particular task (see Figure 6). *Attainment value* is defined as the importance to one's identity of doing well on a task. *Intrinsic value* is defined as the enjoyment experienced by doing the task. *Utility value* is defined as the usefulness of the task in attaining a larger or more temporally distant goal – it is a means to an end. As previously noted, implicit in the degree to which one indicates high *utility value* for a task is the assumption that one has correspondingly high *outcome expectancy* for the task, as both definitions indicate a belief that completion of a task will lead to a desired outcome. As with any definition of value, these are subjective assessments, so that two different people may have very different value assessments for the same task. Furthermore, value is independent of the task and may not only be valued differently, but even when valued equally may be valued for different reasons. For example, Johnny, Susie and Jane may all indicate that they value calculus. However, Johnny may take calculus because success in doing so is deemed "important" by the larger culture of which he is a part and is central to his identity (attainment value), whereas Susie may do so because she genuinely enjoys learning about math (intrinsic value). Jane may not think it is enjoyable or important to her identity, but takes calculus because doing so will help get into college (utility value). All of them are motivated to engage in the same activities (trying to do well in calculus) but they all value it for different reasons. These reasons for valuing a task are not mutually exclusive, and having multiple reasons for doing a task has an additive effect on overall value.

Cost is defined in terms of opportunity costs, or the sacrifices one has to make in order to successfully pursue the task at hand, in addition to the amount of time effort one expects to have

to put into completing the task (Eccles, 1987; Eccles et al., 1983, Wigfield & Eccles, 1992). The following figure is an adaptation that highlights in bold the breakdown of the value construct into its more fine-grained subcomponents.

Figure 6: Subcomponents of Value in the Expectancy-Value Model



Eccles and colleagues (1983) describe four antecedents of task value, including 1) perceptions of the values of important others (parents, teachers, peers), 2) previous affective experience with similar tasks, 3) self-schema and goals and 4) the availability of other opportunities and the costs and benefits of pursuing those *relative* to the task at hand.

Importantly, Eccles et al. (1983) suggest that it is not the value of important others *per se* that influences a child's values, but rather the child's *perception* of others' values. This distinction is important because some of the sociological explanations for the achievement gap that will be reviewed later, such as family structure, indicate that while parents may indeed place

high value on child achievement tasks, being overly taxed with other obligations may hinder the proper transmission of these values, resulting in child perceptions that are incongruent with parents' true values.

Affective experience with similar tasks or domains is thought to influence value because people tend to value those activities with which they experience success and the positive emotions that accompany success. Empirical evidence that indicates that as children grow older, the relationship between expectancies and values is positive supports this notion. In addition, affective experience may influence perceptions of cost such that those tasks associated with negative affect may be perceived as more difficult and, thus, needing more effort to complete.

Self-schema and goals are thought to impact value through the attainment and utility value of tasks. The theory of "possible selves", which are described as *self-relevant* cognitive manifestations of one's future goals, including hopes, expectations and fears, asserts that these future goals are greatly influenced by the salient features of one's identity, such as gender, socioeconomic status, and race (Markus and Nurius, 1986). For example, if one believes that "people like me" do not attend college, then one is not likely to feel that it is a self-relevant goal, therefore concluding that achievement in college-track courses during high school are neither personally important (attainment value) nor useful in attaining a distant goal (utility value).

Finally, the availability of other opportunities, or, conversely, the need to meet other obligations is a situational factor that influences the *relative* aspects of cost and benefits associated with tasks. This influence was apparent in the previous review of delay of gratification. While individuals may place a high *absolute* value on a variety of goals and tasks, constraints on time often mean that individuals must choose among competing alternatives, thus

requiring them to rank or prioritize valued tasks. The cost of forgoing another important task may be too great to justify partaking in the current task at hand, even if it is highly valued.

Having summarized these four antecedents to value that Eccles and colleagues (1983) have proposed, one can draw parallels between these and the antecedents to efficacy/expectancy proposed by Bandura (1977). For instance, perceptions of important others is similar to Bandura's concept of verbal persuasion, previous affective experience is similar to both Bandura's concept of previous accomplishments and physical and affective reactions, and self-schema and goals is similar to Bandura's concept of vicarious experiences. These parallels perhaps help further explain why a positive relationship between expectancies and values exist, since there appears to be overlap in the variables that precede the two constructs.

As was the case with expectancies, the development of values unfolds over time in response to these antecedents. Eccles, Wigfield and colleagues have examined both how mean level of value develops over time, as well as how the structure of the different subtypes of value develops over time. For instance, Eccles and colleagues (Eccles & Midgley, 1989; Eccles et al. 1984) have found that children appear to value academic tasks less as they get older. In particular, math seems to continue decreasing in overall value through middle school (Wigfield et al., 1991), although another study found that across elementary-age children in first, second and fourth grades, math value was already quite low and did not differ by grade level (Wigfield et al., 1997). Conversely, value of English decreased throughout the elementary school years but then began increasing again in middle school. Notably, valuing of sports increased over the elementary years (Wigfield et al., 1997). With respect to development of distinctions between subtypes of values, Wigfield et al. (1992) have found that young elementary age children do not appear to distinguish between utility and attainment value, but do make a distinction between intrinsic and

utility/attainment value. The more nuanced distinctions between all three subtypes do however become apparent around the fifth grade (Eccles and Wigfield, 1995).

One issue with studying the model empirically is a need to differentiate the level at which a task or a goal is identified as a target for value when measuring this construct. In other words, inconsistencies in how researchers operationalize "task" may contribute to inconsistent and/or misleading findings. For instance, assessing the degree to which a student values or expects to succeed in a *subject* (e.g. math) could conceivably yield very different results compared to asking about a *particular course* (e.g. introductory algebra), or even a particular *assignment* within a course (e.g. introductory algebra final exam), particularly since there is variation in rigor across courses and across assignments within courses. Clarifying or at the very least differentiating between them may be important to more accurately predict outcomes based on expectancy and value, particularly among those populations for whom typical measures of expectancy and value do not seem to predict academic achievement. This distinction may be important, because, as noted earlier, achievement is distinguishable from ability because it requires not just learning and mastering academic content, but the additional need for performance to demonstrate this learning to others. This performance requires additional effort (and sometimes skills) that go beyond absorption of material, thus intrinsic value of academic tasks should take into consideration the enjoyment or interest in performance/learning *demonstration tasks*, rather than interest in domain-level learning alone. In short, while a class or subject may be interesting, and thus seem high on intrinsic value, actual completion of assignments within a class or subject may be done more out of necessity, and thus be the product of utility value, rather than intrinsic value.

Another potential issue with measurement of the value construct is that the subcomponent of cost is understudied in the literature, and is rarely present in analyses predicting academic outcomes using the expectancy-value model. Recognizing that overall value is assessed by ascertaining the total benefit of something *minus* the total cost then, one can see that, without ascertaining one's perceived cost, the total value one assigns to a task may not be an accurate indication of overall value for a task. In other words, scores on overall value may be inflated if only the benefit, and not the cost, of the task is measured, because cost should moderate the perceived benefit.

In terms of predicting academic outcomes and explaining group differences in achievement, several studies have found that, compared to the value construct, expectancy is more predictive of actual performance in math and English, whereas the value construct is more predictive of intention and choice of courses (Eccles et al., 1983; Eccles et al., 1984; Meece, Wigfield, & Eccles, 1990). Furthermore, intrinsic value was the strongest predictor of intentions to pursue more math courses among middle school students, whereas both intrinsic and utility value of math were the strongest predictors of intentions to continue taking math courses (Wigfield and Eccles, 1989).

Interestingly, empirical evidence suggests that that African Americans report levels of expectancy and value of education that are equal to or higher than European American youth (Steinberg, Dornbusch & Brown, 1992; Winston, Eccles, Senior & Vida, 1997). In other words, the theorized motivational determinants of action do not seem to explain differences in academic outcomes across racial groups. This raises implications for the predictive validity of the expectancy-value model of achievement motivation. In particular, it suggests that either the model is not universally applicable or that perhaps there is another variable whose presence is

needed to "catalyze" these motivational determinants. I propose the latter, and specifically self-regulatory strength as a third determinant of self-regulated behavior.

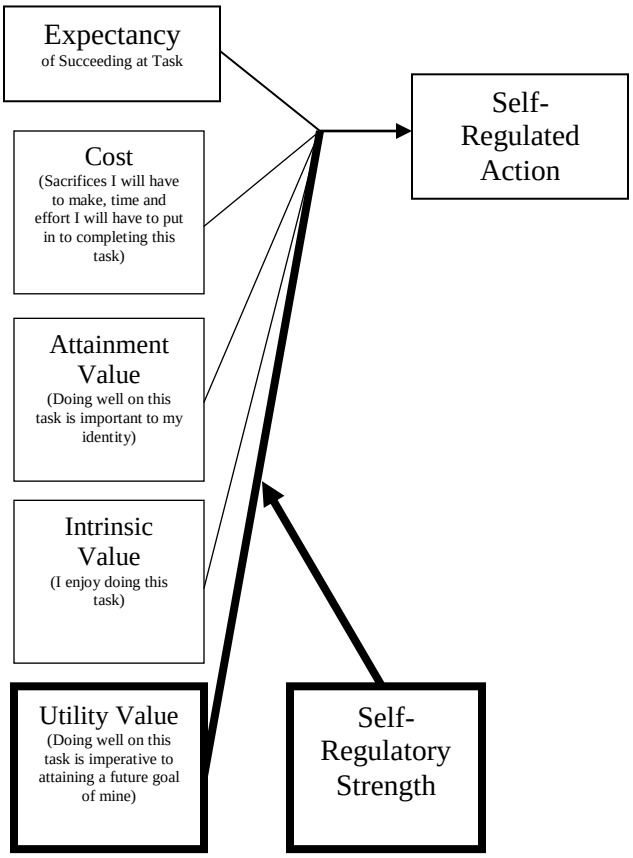
The Third Determinant of Self-Regulation – Self-Regulatory Strength

Previously, when discussing the distinctions between different constructs under the umbrella of self-regulation, the distinction between self-regulation, volitional control, self-control, and delay of gratification was highlighted. A concrete example of volitional control that does not represent self-regulation is reading a book for leisure. The motivation, or desire to read a book for pleasure, determines the action, or control of volition – to actually read the book. In this instance, reading the book is intrinsically valuable and thus, immediately gratifying. This can be contrasted with reading a book not for leisure, but because it is a requirement of a course in which one wishes to excel. The latter is an instance of the sub-type of volitional control that is called self-control, and more specifically, delay of gratification, because the desire to read the book in an effort to do well in the class is not done for pleasure and is not immediately gratifying. The desire, or motivation, in this instance is based on the utility value assigned to the task of reading, and reading the book is seen as a means to a distant goal (doing well in the class) that is rewarding. The desire to read the book, in this instance, is presumably competing with desires to do more immediately-gratifying, but less valuable tasks. As such, one must self-regulate and "override" the desire to do these more immediately gratifying, but less valuable tasks in order to complete assigned reading. Outwardly, both actions appear to be identical (reading a book), but from a motivational perspective, they each *correspond to different underlying subtypes of value* (intrinsic value versus utility value).

I stress the importance of understanding the subtype of value of the task at hand to draw attention to the possibility that when tasks are high on utility value and low on intrinsic value,

measures of expectancy and value may be *necessary, but insufficient* predictors of self-regulation. That is, motivational intentions in themselves may not be sufficient catalysts of action when rewards are distal and one must delay gratification. Indeed, researchers of self-regulation point to the fact that, despite motivational intentions, efforts to employ self-control often fail (Baumeister, 2002). We may be highly motivated to lose weight, quit smoking, or ace an exam, but find ourselves indulging in fatty foods, cigarettes, and activities that inhibit successful studying. According to Baumeister and Vohs (2007), both motivation (i.e. expectancy and value) and *self-regulatory strength*, or the capacity to carry out intended behaviors, colloquially known as "willpower", are necessary determinants of self-regulation. If academically-oriented tasks such as homework completion are high on utility value and low on intrinsic value, then self-regulatory strength is a plausible third determinant of achievement to incorporate into the expectancy-value model (see Figure 7).

Figure 7: Self-Regulatory Strength as a Moderator of Utility Value



Research conducted by Baumeister and colleagues (Baumeister, 2002; Baumeister, Bratslavsky, Muraven & Tice, 1998; Muraven, Baumeister, & Tice, 1999) suggests a strength model of self-regulation that emphasizes the role of energy reserves in predicting efforts to self-regulate (Muraven & Baumeister, 2000; Baumeister, 2002) noting that self-regulatory strength functions in several ways that are very much analogous to muscle strength. For instance, Baumeister, Bratslavsky, Muraven and Tice (1998) found that, immediately following engagement in self-regulated action, there is a temporary reduction in the capacity to continue or repeat self-regulated action. This temporary reduction is self-regulatory capacity is referred to as "ego-depletion", and is similar to the way in which muscles become tired and "weaker" with consecutive use. Additionally, continued "exercise" of self-control, along with adequate periods

of "rest" after each self-regulated performance increases the underlying capacity or strength reserve, just as continuous weight-lifting sessions, followed by periods of rest, increases the stamina of muscle strength (Muraven, 2010; Muraven, Baumeister, & Tice, 1999). Finally, it has been found that self-regulation is reliant on and consumes the body's physical store of glucose (Gailliot et al., 2007). As such, self-regulatory strength, just like muscle strength, is impacted by how much of this nutritional element is present in the body.

The domain of the self-regulatory task does not seem to matter, as they all appear to draw upon the same source. Seemingly disparate acts of self regulation and executive function, such as suppressing emotion, resisting tempting desserts, and making decisions or choosing among options have been found to subsequently interfere with equally disparate acts of self-regulation such as squeezing a hand grip and persisting with anagrams and puzzles (Baumeister, 2002). This finding is important with respect to understanding possible socioeconomic and racial differences in self-regulation in an academic context, because it indicates that systematically-experienced burdens associated with poverty and racism, and not inherent differences in self-regulatory capacity, may explain group differences.

Indeed, emerging evidence suggests that stress associated with both poverty and negative life events mediates the relationship between these microsystem contexts and children and youth's individual capacities to self-regulate (Blair, 2010; Blair et al., 2011; Duckworth, Kim, & Tsukayama, 2013; Morgan, Farkas, Hillemeier, & Maczuga, 2009; Raver, Blair & Willoughby, 2013). Furthermore, the quality of parenting seems to partially mediate both the relationship between lower socioeconomic status (as indicated by maternal education) and self-regulation as well as between ethnicity and self-regulation, as African American mothers and mothers with

low levels of education exhibited poorer quality parenting, that in turn predicted lower capacity to self-regulate (Morgan, Farkas, Hillemeier, & Maczuga, 2009).

Given the role of environmental contexts in shaping the three theorized proximal determinants of individual self-regulation – expectancy, value, and self-regulatory strength – I will next turn to a review of theoretical explanations of the achievement gap that examine the effects of child environment on achievement outcomes.

Environmental Perspectives

Environmental explanations of achievement disparities are generally emphasized by sociologists, economists and anthropologists. Included under this broad umbrella are paradigms that focus on the role of society and the structures within it (macrosystem), culture (macrosystem and microsystem), teachers and the classroom context (microsystem), schools and the organizational context within them (exosystems), parents and family context (microsystem) and, perhaps most importantly, the relationships and tensions between these system level contexts (mesosystems). With but one exception (Fordham & Ogbu, 1986), most of these environmental perspectives (e.g. Bourdieu and Passerson, 1977; Bowles and Gintis,1976; Lewis, 1966; Willis, 1981) explain differences in achievement primarily as a function of social class, and by implicit extension, race, since as previously noted, African American children are much more likely than White children to be in families with a low socioeconomic status.

The environmental perspectives to be described can be broadly organized into 1) cultural mismatch perspectives and 2) family structure perspectives. A recurring theme across environmental perspectives is the assertion that there is a mismatch between the larger culture's beliefs and expectations about what constitutes a relevant education and the degree to which different subcultural beliefs and expectations align with those of the broader culture. As such,

these paradigms are grouped as "cultural mismatch paradigms". The second group of environmental paradigms of achievement disparities focuses on the role of family characteristics and processes in perpetuating achievement disparities.

Cultural mismatch perspectives. Many of the environmental perspectives for explaining the achievement gap focus on the role of culture, and the apparent mismatch between the dominant or "mainstream" culture and the many sub-cultures that exist within the United States. Cultural perspectives that explain differences in academic achievement as a function of both social class and ethnicity are reemerging in social science research after having been previously shunned in the academic community for "blaming the victim" (Small, Harding, & Lamont, 2010). As has been the case with the psychological theoretical constructs reviewed here, there is no clear consensus on what, exactly, is culture, although in the broadest sense, Wilson (2010) suggests that it is "the sharing of outlooks and modes of behavior among individuals who face similar place-based circumstances" (p. 202). However, details regarding its distinction from and relation to structure, its components, and its impact on explaining individual-level cognitions and behaviors are widely debated.

Attempts to summarize components of culture indicate that there is some overlap in many proposed conceptualizations. For instance, Macionis & Gerber (2010) identify five elements of culture, including 1) symbols, 2) language, 3) values, 4) beliefs and 5) norms. Conversely, Small and colleagues (2010) summarize seven perspectives of culture including 1) values, 2) frames, 3) narratives, 4) repertoires, 5) symbolic boundaries, 6) cultural capital, and 7) institutions. *Value* is described as the judged worth of the goals toward which one directs one's behavior. *Frames* are conceived of as a lens through which an individual perceives "how the world works", with these perceptions being shaped by one's previous experiences and subsequent interpretations of those

experiences. *Narratives* are conceptually similar to frames, being described as perceptions and interpretations of the world and the meaning of their own social identities. However, unlike frames, narratives emphasize the role of understanding one's life course as a series of "stories" that are causally linked events. *Repertoires* are described as strategies or *known* modes of action (e.g. how to prepare for college, how to complete a novel homework assignment) that facilitate or constrain successful attainment of valued goals. Thus, a lack of knowledge of such strategies or modes of action may result in behaviors that seem inconsistent with valued goals.

Symbolic boundaries are conceptualized as distinctions individuals make between practices and people, and the implied hierarchical classification associated with these distinctions (e.g. a white college student seeing oneself and other white college students as academically superior to black college students based on the assumption that their presence on campus is due to affirmative action policies). Symbolic boundaries function as rules that inform social identity and dictate social relations and interaction both within and between perceived groups. *Cultural capital* is described as knowledge, skills, tastes or preferences that one has or exhibits that serve as a reflection of high status, and that are simultaneously valued by the majority who also belong in this high status culture group. Because they are valued by the dominant culture, they become institutionalized and often serve as standards by which to judge individuals' competence – judgments which subsequently serve to direct individuals into paths that have implications for labor-market participation. Finally, the concept of *institutions* is described as the formal and informal regulations of behavior espoused by the larger society, which may be based on assumptions of how the world works (i.e. which may be based on the frames collectively shared by high-status, high-power individuals). Notably, many of these conceptualizations map nicely onto constructs and socio-cognitive pathways that were previously described in Eccles' and

colleagues (1983) expectancy-value model, particularly expectancies and their dependence on cultural cues and interpretations of one's experiences.

In the United States, the dominant or "mainstream" culture is exemplified by those values consistent with middle-class belief systems such as the importance of education and a good work ethic, self-reliance, personal responsibility, initiative and perseverance (Steele, 1990). In addition, middle-class speech patterns or "standard English" constitutes the language of the dominant culture (Lamont, & Lareau, 1988). Most of the cultural mismatch perspectives focus on these elements of culture and their distribution on explaining differences in achievement.

According to Hallinan (2001), cultural mismatch paradigms such as culture of poverty (Lewis, 1966), oppositional culture (Fordham & Ogbu, 1986), cultural capital theory (Bourdieu and Passerson, 1977), and culturally responsive teaching (e.g. Au, 1980; Banks, 1995) can be organized into two primary branches, including 1) cultural deprivation perspectives and 2) cultural difference perspectives. These are similar in that they each focus on the incompatibility of the subcultures (e.g. the culture of poverty or African American culture) with the dominant culture (i.e. white, Protestant, middle-class culture) as an explanation for how achievement disparities come about. However, they are different in that theories of cultural deprivation imply that the sub-cultures are *inferior* to the dominant culture, and must be changed in order for low-SES and/or African American to successfully participate in the dominant culture and its institutions – including school and work. Cultural difference theories, on the other hand, focus on the relativist nature of culture and imply that there is simply a *difference* between the values in the dominant culture and sub-cultures, usually manifested as a difference in students' school culture and home culture (Nieto, 2005). Importantly, cultural difference perspectives insist that the dominant culture is not superior to the minority culture. In other words, the two theories are

at odds regarding their implications for *how to reduce the achievement gap.* Cultural deprivation implies that a failure to *assimilate* into the dominant culture is what perpetuates the cycle of low achievement, while cultural difference theory implies that a failure of the dominant culture to *accommodate* the subculture is what perpetuates the cycle of achievement.

Cultural deprivation perspectives. Under the umbrella of cultural deprivation perspectives are two distinct theories that have been used to explain disparities in academic achievement – culture of poverty (Lewis, 1966) and oppositional culture/cultural inversion (Fordham & Ogbu, 1986). These theories assert that the main reason that African-Americans and the underclass have lower academic and professional achievement is that their culture consists of values and behaviors that are inconsistent with those endorsed by the dominant culture and perpetuated by its institutions. Consistent with Wilson's (2010) assertion that both structure and culture give rise to behavioral patterns, two important components of each of these theories are that 1) these patterns of behavior are natural adaptations to the oppressive circumstances under which they were created, and *not the result of personal moral failings* and 2) these behaviors are self-defeating and have the power to perpetuate the poverty cycle even when opportunities for social mobility become available, because they are incompatible with the behaviors expected by the institutions that are responsible for social mobility – schools and work.

Culture of poverty. The term "culture of poverty" was coined by anthropologist Oscar Lewis (1966), and describes a subculture marked by a constellation of dozens of "traits" on four dimensions – the relationship of the subculture to the dominant culture, the nature of the subculture community (i.e. the "ghetto"), the nature of the family, and, finally, the nature of the beliefs and behaviors of the individual. Examples of these traits that he observed include disengagement from the dominant culture and its institutions, a lack of social organization within

the community, family structures in which parents are not married (and may not be present), and individuals who are not future-oriented and feel helpless about their circumstances. As previously mentioned, Lewis (1966) stresses that these patterns of behavior are a legitimate adaptation to the oppressive circumstances under which they developed, noting too that they are not confined to certain racial or ethnic groups. However, he also highlights how these patterns of behavior may serve to perpetuate poverty inter-generationally, despite improvements in circumstances, stating,

> "Once the culture of poverty has come into existence it tends to perpetuate itself. By the time slum children are six or seven they have usually absorbed the basic attitudes and values of their subculture. Thereafter they are psychologically unready to take full advantage of changing conditions or improving opportunities that may develop in their lifetime" (p. 21).

Unfortunately, Lewis' assertion that these patterns of behavior are not inherent to certain groups and are legitimate adaptations to negative environmental contexts is often lost on both those who embrace and oppose the theory. The theory has been used by conservatives, for example, as justification for reducing social welfare services to those who, in their eyes, are poor by choice. In response, the theory has been blasted by liberals as one that "blames the victim" (Cohen, 2010).

Oppositional culture/cultural inversion. Similar to the culture of poverty theory is Fordham and Ogbu's (1986) oppositional culture theory. This theory, like the culture of poverty theory, asserts that dysfunctional patterns of behavior develop as an appropriate response to historical oppression, and furthermore, that these responses continue to perpetuate negative circumstances long after formal structures of oppression have been

removed (or reduced). However, this theory differs from the culture of poverty paradigm in three regards. First, while the culture of poverty theory *implies* that low academic achievement plays a role in the path of the intergenerational poverty cycle, this is never explicitly stated. In contrast, identification of the schools-to-jobs pathway as the primary mechanism of social mobility is a central component of oppositional culture theory (Fordham & Ogbu, 1986; Harris, 2008). Second, whereas Lewis (1966) focused on traits of the subculture that he explicitly notes transcend race and ethnicity, Fordham and Ogbu (1986) focus on cognitions and behaviors that are particular to the Black community. Third, whereas culture of poverty theory indicates that a failure to assimilate into the dominant culture arises out of a *passive* response to one's circumstances (apathy), oppositional culture, as the name implies, indicates that a failure to assimilate arises out of an *active* resistance to the values and norms of the dominant culture (Fordham & Ogbu, 1986; Harris, 2008).

Specifically, oppositional culture theory explains that, in the United States, the pathway to wealth as an adult begins with achieving academically and then obtaining a high-paying job upon completing one's formal education. Because, historically, African Americans were blocked from receiving a decent education or a decent job upon receiving a good education, this traditional pathway became not only irrelevant, but also symbolized adherence to the values espoused by the oppressors. In response, a culture of opposition developed, in which academic achievement is viewed as "acting White" and, as such, is incongruent with Black cultural values (Fordham & Ogbu, 1986; Harris, 2008).

Much like Lewis' (1966) culture of poverty framework, Fordham and Ogbu's (1986) oppositional culture framework has been criticized for blaming the victim and

failing to recognize the role of structural barriers as the reason for persistent disparities. However, while acknowledging that structural barriers do indeed play a role in explaining disparities, Ogbu and Simons (1998) have argued that this is not the sole reason for disparities, citing research that consistently finds that certain other minority groups who also face structural barriers based on discrimination due to language and phenotypical physical features, nonetheless have higher average levels of academic achievement than African American children and youth.

In an effort to explain why certain groups of ethnic minorities outperform others, Ogbu and Simons (1998) proposed a distinction between autonomous or voluntary minorities and caste-like or involuntary minorities. Autonomous or voluntary minorities arrive in the United States by choice, looking for a better future with the understanding and expectation that assimilation into the culture (i.e. learning new language and behaviors) will result in their upward social mobility. Caste-like or involuntary minorities, on the other hand, are descendents of those who arrive in the United State by force (e.g. those who were brought from Africa to serve as slaves) and view Whites in particular as the force behind their involuntary presence in the United States. Thus, the differences in attitudes, expectations, and behaviors brought about by differences in group histories accounts for disparities in achievement beyond what is accounted for by structural barriers.

Cultural difference perspectives. Under the umbrella of cultural difference paradigms lie separate but related lines of research that have been used to explain disparities in academic achievement – those that focus on school- and district-level practices as mechanisms of social reproduction and those that focus on culturally responsive teaching. They are similar in that they

both focus on the role of schools in perpetuating social inequality and the need for schools accommodate and respond to differences in culture. However, they differ with respect to their emphasis on both the mechanisms by which achievement disparities are created and how best to intervene, with social reproduction focusing on district- and school-level organizational practices and culturally responsive teaching focusing on classroom-level practices.

Social reproduction in education. In the mid-1970's the theory of social reproduction in education emerged as an explanation for the propensity for children and youth to face educational, occupational and social class outcomes in adulthood that closely mirrored that of their parents. Research conducted by Bowles and Gintis (1976), Willis (1981) and Bourdieu and Passerson (1977) focused on the role of *schools* in reinforcing social stratification across generations, asserting that the organization and practices espoused by schools led to sorting of children and youth into pre-determined trajectories of education that destined them for "their dominant or dominated places in the economy and society" (Collins, 2009, p.35). In short, social reproduction in education perspectives assert that the reason that parents' socioeconomic status has such high predictive validity for their children's later socioeconomic status is that schools prepare children for future occupations that are directly associated with the social class from which they come. Any differences in achievement by race are thought to be largely due to the lower class status of many minorities and not due to race per se.

According to Bordieu's cultural capital theory (Sullivan, 2001), this process begins with differences in cultural capital across social classes, which includes preferences, manners and especially language (e.g. Bernstein, 1960, 1964). Schools place a high value on the cultural capital espoused by the dominant culture (i.e. the "educated language" of White, upper-middle-class culture) and systematically devalue that which is espoused by the lower social class

cultures. These differences in cultural capital lead to different academic (and subsequent employment) trajectories for youth, either directly, through their impact on academic achievement (e.g. when differences in language make understanding written text difficult, grades suffer and children are tracked downward), or indirectly, through their role in facilitating concerted efforts to promote those who exhibit behaviors associated with high status jobs through the high-status (i.e. college-track) pipeline (e.g. when valued behaviors are apparent, faculty and staff make decisions about tracking and counseling that facilitate college preparedness). Children are then separated into different trajectories of education, in which the high achievers are exposed to opportunities for critical thinking that prepare them for white-collar jobs and low achievers are taught to follow orders that prepare them for blue-collar jobs (Anyon, 1981; Bowles and Gintis, 1976). This differential training results in differential accumulation of human and cultural capital over time, which includes skills, knowledge and experience. The disparity in human capital then manifests itself as disparities in employment opportunities, as high status, white collar jobs value the kind of skills, experience and knowledge obtained throughout the high-achievers' trajectories of educational training (Bourdieu and Passerson, 1977).

Researchers have pointed to several specific qualities and practices found in schools that are evidence of non-neutral processes and mechanisms by which social reproduction may occur, including differential school quality and resources and ability sorting and teacher expectations. (Hallinan, 2001; Lamont, & Lareau, 1988).

Disparities in quality between schools that are populated primarily by poor, minority children and youth and those populated by middle-to-upper-class White children and youth have been well-documented empirically. For instance, children of color tend to be concentrated in the

highest poverty schools in the U.S. (National Center for Education Statistics, 2009f), which too often have lower per-pupil spending (Heuer & Stullich, 2011), higher percentages of inexperienced teachers (National Center for Education Statistics, 2003) higher teacher turnover (National Center for Education Statistics, 2008b), and fewer teachers trained specifically for the subject they are teaching (National Center for Education Statistics, 2004). Likewise, schools with the highest concentration of students living in poverty experience higher percentages of instructional interference due to environmental factors within schools, such as poor physical condition of the building, lighting, and sound control (National Center for Education Statistics, 2005).

The district- and school-level practice of ability sorting is another way in which children are exposed to differential learning opportunities over the course of their educational trajectories. Ability sorting it is espoused because it is supposed to allow for teachers to tailor their teaching to the group based on their ability level. It is criticized because low-income and minority students are more likely to be assigned to low ability groups. Oakes, Gamoran, and Page (1992) found that placement in a higher ability group is associated with better outcomes, regardless of the students' *actual* ability. Research has also found that Black children are indeed more likely to be placed in lower ability groups, but once previous achievement is controlled, these differences in ability assignment by race no longer exist (Alexander and McDill, 1976; Catsambis, 1994; Darling-Hammond, 1994; Hallinan, 1991, 1992; Oakes, 1990). Interestingly, Hallinan (2001) states "Thus, black students are disadvantaged by ability grouping not because of their race, but because their achievement leads to their being enrolled in lower ability groups" (p. 62). However, she fails to discuss one of the cardinal arguments of cultural capital theory, which is

that the cultural capital of the dominant culture is what is valued in schools, and thus, the demonstration of capital may itself indicate "achievement" (Bourdieu and Passerson, 1977).

Related to the practice of ability sorting is the role of teacher expectations as another mechanism by which schools are thought to perpetuate inequality. Evidence of the importance of teacher expectations in contributing to children's cognitive outcomes came to light in Rosenthal and Jacobson's (1968) groundbreaking study, in which they found that when teachers erroneously believed that children were higher ability than they actually were at the time of testing, the students (at least the younger ones) actually had better outcomes than a control group. A later review conducted by Jussim and Harber (2005) pointed to a number of controversies and mixed results in the 30 years of research following the original study, concluding that effect sizes for teacher expectations are generally small, but that analyses exploring the moderating effect of various contextual variables find that positive expectations have medium effect sizes for groups generally considered stigmatized, including Black children and children from lower SES backgrounds. These nuances are important considerations in light of the fact that research has consistently found that teachers have lower expectations for Black children and low SES children (Alexander, Entwisle & Thompson, 1987; Beady & Hansell 1981) and that teachers more often cite these children as having less competence and more behavioral problems as well (e.g. Pigott and Cowen, 2000).

Culturally responsive teaching. A variety of perspectives exist under the umbrella of culturally responsive teaching, all of which focus on describing methods that teachers can draw upon with the explicit intention of *accommodating* different cultures in their classrooms. Banks (1995) identifies five pillars of multicultural education, which he describes as an attempt by teachers and administrators to create equal learning opportunities for diverse groups of students.

These five pillars include 1) content integration, or the degree to which teachers use a variety of examples pulled from different cultures and/or ethnic groups to illustrate concepts being taught, 2) knowledge construction, or the degree to which teachers emphasize and encourage critical analysis regarding the biases that are present in how knowledge is constructed, 3) prejudice reduction, or the degree to which teachers devise lessons aimed at cultivating acceptance and understanding of groups that are different than one's own, 4) equity pedagogy, or the degree to which teachers include teaching methods that are consistent with the variety of culturally-valued ways of learning among the students they are teaching and 5) an empowering school environment and social structure, in which the previous four methods are fully embraced and ingrained in school-wide culture and organization. Similar concepts include culturally congruent instruction (Au, 1980), culturally relevant teaching (Ladson-Billings, 1995), culturally responsive teaching (Gay, 2010), and culturally compatible teaching (Jordan, 1981;1984).

Having discussed the role of cultural explanations for achievement disparities, I will next turn to a review of perspectives that emphasize the role of family structures and processes in perpetuating achievement disparities.

Family Perspectives

Two broad perspectives on the role of family in understanding the achievement gap include 1) family structure perspectives and 2) economic stress perspectives. Both broad perspectives emphasize impediments to intended child socialization within the family unit as the mechanism by which family dynamics impact academic achievement.

Family Structure. Academic achievement is lower among children and youth who do not live with both of their parents (Astone & McLAnahan, 1991; McLanahan & Sandefur, 1994). Because both Black children (Kennedy & Bumpass, 2007, Kids Count, 2013; Ventura &

Bachrach, 2000) and children from low socioeconomic backgrounds (Shattuk & Kreider, 2013) are more likely to live in single-parent households, family structure has been identified as a possible explanation for achievement disparities by race and class.

The history of the family structure paradigm began with the "Moynihan Report" (1965), which focused primarily on the African-American family and primarily on the absence of fathers. Since then, increases in other non-traditional family structures have continued to grow among all subpopulations within the U.S.; however the rate of increase has been disproportionately higher among historically disadvantaged groups (Ellwood & Jencks, 2004).

The family structure paradigm postulates that children who grow up living with both biological parents will be better off than children in other alternative family units, including both single-parent homes as well as divorced-parent homes. While studies have consistently found that living with both biological parents yields the best child outcomes (Amato, 2005; McLanahan & Sandefur, 1994; Sigle-Rushton & McLanahan, 2004), the literature has been rife with inconsistencies with respect to understanding whether different types of non-traditional families (e.g. never-married mothers, divorced parents, cohabitating parent, single fathers, adoptive parents, blended families, etc.) have comparatively more or less of a negative impact on child outcomes. Furthermore, and perhaps more importantly, explanations for *why* children from non-traditional families fare worse remain varied and controversial (Gennetian, 2005).

Several theoretical paradigms have been proposed to explain what characteristics of family structure matter, how family structures impact child outcomes and why this may be. These five paradigms include 1) role model/male model/social learning paradigm, 2) socialization/social control paradigm 3) economic/human capital paradigm 4) evolutionary

psychology paradigm 4) selection bias/parental competence paradigm and 5) stress paradigm (Biblarz & Raftery, 1999; Heard, 2007; Heiss, 1996).

Importantly, each of these perspectives asserts that children of two-biological parent families are better off than children of other non-traditional families, including single-parent families and step-families. As such, *any* of these paradigms may explain the achievement gap both as a function of race and socioeconomic status, since, as previously noted, African Americans and low socioeconomic status students are both more likely to come from single-parent (and particularly single-mother) homes. While there is overlap, each paradigm stresses different characteristics of family structure that are important to child outcomes such as number of parents present in the home, biological relatedness of parents to the child, gender of parents, employment status and income of parents, marriage status of parents and pre-existing or genetic dispositions of parents such as propensity toward depression that would be predictive of both family structure and child outcomes. In stressing different family structural characteristics that matter, they are implicating different mechanisms by which family structure impacts child outcomes.

Family structure and role model/male model/social learning. The first paradigm, identified as role model, male model, socialization theory, or social learning theory came in response to the observation that children in single-mother families fared significantly worse than children in two-parent families on outcomes such as academic achievement and behavioral function. The focus is on the *gender* of the missing parent, as historically "single-parent" has overwhelmingly meant "single-mother", and suggests that the negative impact of absence of an adult *male* parent results in a lack of proper role modeling, which in turn has a negative impact on children's development. More specifically, this paradigm suggests that certain aspects of child

socialization are possible only through exposure to a father, such as learning to defer to authority and observe how an adult functions in the world of work (Heiss, 1996; McLanahan, 1985; Moynihan, 1990). This focus on single-motherhood in particular was termed "the pathology of matriarchy" , an argument that appears overtly sexist at best, as it is unclear as to why skills such as deference to authority or work ethic can only be modeled or reinforced by a male. Furthermore, as previously mentioned, research has since found that it is not only single-motherhood that is associated with negative outcomes, but virtually every type of "non-traditional" family in which both biological parents are either not married or not present, indicating that the male gender of the absent parent does not appear to be the primary explanation for differences in child outcomes (Parke, 2003).

Family structure and economic/human capital paradigm. The economic/human capital paradigm posits that the two-parent family, regardless of the biological relationship with the child, is better than a single parent family and further, that among single-parent families, children of single-father families will fare better than children of single mother families since, on average, men have higher incomes than women (Becker & Tomes, 1986). The important characteristics of family structure, according to this paradigm, are the *number of parents* in the home and the *employment status* (and by extension, the level of income) of the parent(s). This paradigm focuses on the importance of human capital development of children, which is the result of a combination of both economic resources such as those things that are purchased and are thus dependent on receipt of income, as well as services necessary to household function such as cooking, cleaning, child care, home maintenance (Becker & Tomes, 1986). The presence of two parents allows for maximization of the two precursors to the development of human capital in

children – the provision of economic resources through employment and the provision of household services. A single parent simply is not able to do as much as two parents.

This paradigm would predict that children in step-family households will fare as well as children in families in which both biological parents are present, since it is the number of parents and not the biology that is important. Controlling for income, a difference in child outcomes between single-mother and single-father families would be expected to disappear. Similarly, a substantial reduction in the differences between children of single parents and children in two-parent households would be expected after controlling for income.

This paradigm is partially supported by evidence that controlling for income substantially reduces or eliminates differences in academic outcomes between children of single parents and children of two-parent families (Cooksey, 1997; Smith, Brooks-Gunn & Klebanov, 1997). However, longer-term child outcomes remain consistently worse among children of single parents, even after controlling for income, and children in two-parent step-families consistently fare worse than children in two-parent biological families (Gennetian, 2005), findings that cannot be adequately explained by the economic/human capital paradigm. Furthermore, as previously noted, children whose parents have remarried fare worse than children whose parents remain married, further undermining the argument that number of parents and income alone can explain differences.

Family structure and socialization/social control paradigm. Socialization theory posits that parents play a significant role in socializing children (Baldwin, 1948; Baumrind, 1978; Baumrind, 1996). They do this through setting standards of behavior, modeling these behaviors, monitoring the degree to which children are adhering to such standards, and especially enforcing said standards through various means of control such as physical punishment and verbal praise

(Baldwin, 1948; Baumrind, 1978; Bulcroft, Carmody, & Bulcroft, 1998). With respect to academic achievement in particular, children have better academic outcomes when their parents communicate educational goals and values and are more involved in their children's schooling (Astone & McLanahan, 1991; Epstein, 1988; Grolnick & Slowiaczek, 1994; Rumberger, Ghatak, Poulas, Ritter, & Dornbusch, 1990).

A socialization and social control paradigm would predict that the important characteristics of family structure are both the *number of parents* in the home and the *biological relationship* the parents have with the child. Specifically, these suggest that that the presence of *two biological* parents in the home is better to child outcomes than any other family structure, including single parents or remarried parents for two main reasons. The first, and most obvious, reason is that single parents are not able to "make up" for the additional role modeling, monitoring and enforcement that any additional parent would have supplied (Patterson, DeBaryshe, & Ramsey, 1989; Sampson & Laub, 1993). In short, as was explained similarly by the economic/human capital paradigm previously discussed, one parent simply cannot be expected to do as much as can be done when two parents are present and demands on time and resources faced by single parents are likely to reduce the quality and or quantity of such socialization efforts, compared to families in which two parents share these responsibilities (Amato & Keith, 1991; Astone & McLanahan, 1991; Weiss, 1979).

The second reason that the two-biological parent family is better than alternative two-parent families (i.e. parents remarried), is because step-parents have less power in their ability to enforce or control the behavior of step-children (Cherlin, 1978; Furstenberg & Cherlin, 1991; Hofferth & Anderson, 2003). Thus, if in addition to children of single parents, children of alternative two-parent families also have comparatively worse outcomes, one can infer that an

important mechanism by which parenting impacts child outcomes is through the ability to socialize and especially control children's behavior. Indeed, a strength of this paradigm is that it explains why children in two-parent step-families fare worse than children in two-parent traditional (biological) families, lending credence to the explanatory value of this paradigm. This paradigm would also predict that there would be no differences in outcomes between children of biological parents who are stably cohabitating, but not married, and children of biological parents who are married. However, emerging evidence suggests that the former group do indeed fare worse than the latter (Brown, 2004; Artis, 2007), suggesting that socialization and social control may not be the sole mechanisms by which family structure impacts child outcomes.

Family structure and evolutionary psychology. The evolutionary psychology paradigm of family structure postulates that the presence of both biological parents is the best family structure for child outcomes, and further, that children of single-mother families will have better outcomes than children of step-father/biological mother and single-father families, which in turn will yield better child outcomes than step-mother/biological father families. This is because, according to this paradigm, the important characteristics of family structure are parent *gender, number of parents* in the home, and *biological relationship of the parents to the child.* Specifically, gender and biological relationship are important because, according to evolutionary psychologists, while both biological parents have a vested interested in ensuring that their offspring do well, biological mothers are more invested than biological fathers (Emlen, 1997), because their odds of having additional children are much lower than fathers' odds (Trivers, 1972). As Biblarz and Raftery (1999) note,

> "Evolutionary psychologists sometimes depict motherhood as, in part, a strategic exercise in finding ways to secure material resources from sometimes reluctant

fathers, whose reproductive calculus may be pulling them toward future children (and partners) more than present ones" (p. 326).

In contrast to an economic/human capital paradigm, an evolutionary psychology explanation would predict that children in single-mother families would do *better* than children in step-parent families because in the latter, either the biological mother is not present as in the case of biological father/step-mother families, or the child is competing for her resources with a step-father as in the case of biological mother/step-father families (Daly & Wilson, 1996). Also in contrast to economic theory, children in single-mother families would have better outcomes than children in single-father families due to mothers' higher investment in children. Thus, if children of single mothers have better outcomes than children of re-married mothers or single fathers, one can infer that an important mechanism by which parenting impacts child outcomes is through the provision of those investments in children that are not primarily contingent upon economic resources, such as a warm and caring relationship and other forms of social support.

Family structure and stress/emotional trauma to the child. One of the two underlying problems that are thought to possibly impact both family structure *and* child outcomes is parental conflict. Biblarz and Raftery (1999) point to longitudinal research conducted by Cherlin and colleagues (1991) that found that many of the child "outcomes" associated with parental divorce were already present before the divorce actually took place. This could be because children are exposed to parental conflict, which often precedes divorce, and which is known to be harmful to children (Peterson & Zill, 1986). This suggests that family structure per se does not cause negative child outcomes, but rather implicates a third variable – in this case, family dynamics – that are the cause of both family structure and child outcomes. As with other paradigms, this

paradigm fails to explain associations between other family structures and child outcomes, such as why children in stably cohabitating but unmarried parent families fare worse.

Family structure and selection bias. Another paradigm that explains why family structure predicts child outcomes is known as selection bias, which also suggests that family structure is not actually a *cause* of child outcomes, but rather that both family structure and child outcomes are the result of another underlying psychological predisposition of the parent such as reduced interpersonal competence (McLanahan & Percheski, 2008), which may lead to both divorce (or the decision to never marry in the first place) and poor child outcomes, as these parents may espouse weaker "family values" than others (Pepenoe, 1993). In either case, this paradigm postulates that it is not the family structure itself that is thought to impact child outcomes, but rather that particular parents' psychological predispositions result in non-traditional family structures and also result in poorer outcomes among their children.

Summary of results comparing family structure paradigms. In an effort to simultaneously compare the explanatory power of these multiple and sometimes competing paradigms, Biblarz and Raftery (1999) analyzed data controlling for the various characteristics thought to "matter" more or less (i.e. parental biology, marriage status, income, etc.) to child outcomes, including longitudinally-assessed educational attainment and occupational status. Their results support the evolutionary psychology paradigm and are also consistent with the socialization paradigm, but they suggest that support for the economic/human capital paradigm and selection bias paradigm is comparatively low. Beyond their interpretation of the findings, I would argue that the economic/human capital perspective is still supported by their outcomes, with the caveat that income *alone* (and by extension those investments that are dependent on having economic resources) does not seem to be a *sufficient* precursor to child investment, but is

certainly both important and necessary. In other words, the data suggests that simply having the income does not necessarily translate into benefits for children, and I suggest that this is because it must first be exchanged for services and material goods that are then invested in children. Income level partially predicts the quantity and quality of such investments.

Note that the evolutionary, socialization, and economic theories are *not* orthogonal, and as such, may complement each other in terms of explaining 1) *what* characteristics of family structure matter and 2) *why* they matter to developmental outcomes. In sum, biological relationship to child, gender of parent(s) and number of parent(s) seem to matter because they are associated with the degree of investment adults place in children. Specifically, two parents are better than one, and the characteristics of parents (i.e. biologically related and female) that increase their propensity to both effectively socialize children and invest in their development will clearly lead to better child outcomes. Furthermore, while economic investment alone does not sufficiently explain variations in child outcomes, it does account for a significant amount of that variation (Parke, 2003). Family structure matters only to the extent that they facilitate or inhibit parents' ability or propensity to invest in and socialize their children.

Family income and economic pressure. The mechanisms explained by the socialization, evolutionary psychology and economic paradigms in the family structure literature seem interestingly parallel to the two primary models that address how family income, and specifically poverty and economic pressure, impact child outcomes – 1) the family stress model and 2) the investment model (Conger, 2005).

Family stress model. The family stress model asserts that the mechanism by which poverty impacts child outcomes such as academic achievement is through the impact that the economic pressure associated with poverty has on parental behaviors and emotions (Conger,

Conger & Martin, 2010). Parents who are facing economic pressures are more likely to engage in negative patterns of parental behavior including being harsh, inconsistent and/or uninvolved and consequently, children exhibit impaired competence in addition to emotional and behavioral problems (Conger, Conger & Martin, 2010). This is similar to the socialization theory of family structure, in that it stresses the importance of parents' ability to administer appropriate discipline and model appropriate behavior in ensuring positive outcomes in their children.

Investment model. The investment model, on the other hand, asserts that the mechanism by which poverty impacts child outcomes is through parents' inability to make financial investments that are known to foster a variety of positive child outcomes, including a) those things related to cognitive stimulation, such as toys and books, as well as tutoring, music lessons and the like; b) those things related to physical safety and development of the child, such as healthy food, decent housing, clothing and healthcare; and c) those environments that expose children to important others and opportunities such as economically advantaged neighborhoods and schools (Bradley & Corwin, 2002; Conger, 2005). This is parallel to the economic/human capital and evolutionary psychology paradigms of family structure, in that it stresses the importance of parents' ability to purchase material goods and services to aid in the positive development of their children.

As with the family structure paradigms, the family stress model and the investment model are not orthogonal, and instead can be understood as two simultaneous pathways by which family economic pressure leads to negative child outcomes (Conger, 2005). This has important implications for both policy and practice, as multiple paths of mediation indicate a need to simultaneously address the issues associated with each of the paths at multiple levels of children's environments.

The Current Study

Drawing on these literatures, this study is designed to examine whether the addition of self-regulatory strength as a moderator of utility value in the expectancy-value model is warranted. I examine whether the inclusion of self-regulatory strength in a model predicting homework completion eliminates differences in levels of homework completion between Black and White students and poor and non-poor students. I also examine whether parental warmth contributes to youth homework completion via its impact on youth self regulatory strength.

Collectively, this study explores how multiple levels of youths' ecological systems may influence developmental outcomes. These include measures of the macrosystem such as poverty status and race (and the societal implications with which they are associated), measures of the microsystem such as parental warmth and parent help with homework, and measures of individually experienced cognitions and behaviors such as expectancy, value, and self-regulatory capacity.

Specifically, the following research questions will be addressed:

1) Are there differences in the propensity to complete math and reading homework by race and poverty status? I hypothesize that African American youth and youth living in poverty will be less likely to complete their homework than European-American youth and higher income youth.
2) Does the inclusion of self-regulatory strength add to the explanatory value of the expectancy-value model when predicting homework completion? Furthermore, does self-regulation moderate the role of utility value in such a way that it multiplies a positive impact of utility value on homework? I hypothesize that self-regulatory strength will explain a substantial amount of variation in homework completion, and furthermore, that it will interact with

utility value in such a way as to multiply its positive impact on homework completion. In addition, I hypothesize that inclusion of self-regulatory strength will significantly reduce the amount of variation in homework completion explained by race and poverty status.

3) Are there differences in means of the three proposed determinants of academic delay of gratification – expectancy, utility value, and self-regulatory strength – by race and poverty status? I hypothesize that African American youth and poor youth will *not* differ from European American and non-poor youth in either expectancy or value of math or reading. Conversely, it is hypothesized that African American youth and youth living in poverty will have lower levels of reported self-regulatory strength.
4) Is youth self-regulatory strength decreased in the context of microsystem environmental stressors such as low parental warmth, and furthermore, does youth self-regulatory strength mediate the relationship between parental warmth and homework completion? I hypothesize that parental warmth will be positively associated with youth self-regulatory strength and furthermore, that inclusion of parental warmth will significantly reduce the amount of variation in homework completion explained by race and poverty status.

Chapter 3: Method

Sample

Participant data for this study were drawn from the Panel Study of Income Dynamics (PSID) – Child Development Supplement (CDS). The Panel Study for Income Dynamics (PSID) began in 1968 with a nationally representative sample of over 18,000 adults living in 5,000 families in the United States. Data from this original sample and their children (and grandchildren) has been collected continually during the ensuing decades. In 1997, the Child Development Supplement (CDS) was added to the Panel Study of Income Dynamics with the purpose of obtaining more detailed information regarding a how economic and social factors may be associated with variety of developmental outcomes among children. In addition to the first wave, subsequent waves were collected in 2002 and 2007. Data include information sourced from child self-report, parent-self report, parent child-report, teacher child-report, child assessment, and child diaries.

The sample for this study combines the two cross-sectional studies of the first (1997) and second (2002) data collection and was limited to those children who were in school, of age to respond to the child questionnaire (8 years or older at the time of child interview), whose parents identified them as being either African American or European American, and who had a teacher indicate that he or she had the child for an instruction section in either math or reading and that he or she assigns homework for said class. Hispanic youth were excluded because only a very small number had teachers respond and there was no variation in response to the outcome variable among this group.

Response rates for teacher questionnaires were fairly low (52% in 1997; 54% in 2002). Upon exploring possible differences in predictor variables between students whose teachers responded versus those whose teachers did not respond, several variables emerged as significantly different across groups, including the Woodcock-Johnson applied problems standardized score [$F(1, 2856) = 67.27$, $p < .001$], the Woodcock-Johnson standardized broad reading score [$F(1, 2872) = 22.78$, $p < .001$], math expectancy [$F(1, 2864) = 25.88$, $p < .001$], reading expectancy [$F(1, 2863) = 82.75$, $p < .001$], math utility value [$F(1, 2860) = 31.53$, $p < .001$], math intrinsic value [$F(1, 2862) = 49.70$, $p < .001$], reading intrinsic value [$F(1, 2861) = 46.35$, $p < .001$], parent help with homework [$F(1, 3080) = 179.67$, $p < .001$], parental warmth [$F(1, 3080) = 109.76$, $p < .001$], and income needs ratio [$F(1, 2908) = 5.35$, $p = .021$]. Means and standard deviations for each of these variables across teacher response and teacher non-response can be found in Table 1. In addition to these continuous predictors, chi-square analyses revealed that teachers of African American youth had a proportionately lower response rate (27%) compared to European American youth (34%) [$\chi 2$ (df = 1) = 16.02, p < .001][1].

The resulting sample for mathematics includes 489 children in 1st through 8th grades, ranging from eight to 13.5 years (M = 10.36 years), 47.6% of whom identified as female and 47.4% of whom identified as African American. Furthermore, 73.4% were above the poverty threshold, while 16.4% were below. The resulting sample for reading included 706 children in 1st through 8th grades, ranging from 7.92 years to 13.5 years (M = 10.35 years), 48.4% of whom identified as female and 43.5% of whom identified as African American. In addition, 84.7% were above the poverty threshold, while 13.5% were below. There were 383 students who had information on homework completion for both math and reading.

[1] Response rates appear lower than those reported by CDS guildebook because comparative analyses were conducted on the entire sample, whereas response rates calculation in the CDS guidebook was based on a reduced sample of eligible youth.

Table 1.
Means and Standard Deviations for Significantly Different Predictor Variables Across Teacher Response Versus Teacher Non-Response

Variable	Teacher Res	N	*M*	*SD*
Woodcock-Johnson Applied Prob Score (Stnd)	No Response	1935	102.40	16.52
	Response	923	107.81	16.45
	Total	2858	104.14	16.69
Woodcock-Johnson Broad Reading Score (Stnd)	No Response	1949	101.74	19.96
	Response	925	105.40	17.44
	Total	2874	102.92	19.26
Math Expectancy	No Response	1946	4.76	0.89
	Response	920	4.97	0.95
	Total	2866	4.83	0.92
Reading Expectancy	No Response	1946	4.98	0.91
	Response	919	5.32	1.00
	Total	2865	5.09	0.96
Math Utility Value	No Response	1944	5.21	1.67
	Response	918	5.59	1.67
	Total	2862	5.33	1.68
Math Intrinsic Value	No Response	1945	4.42	1.77
	Response	919	4.92	1.75
	Total	2864	4.58	1.78
Reading Intrinsic Value	No Response	1944	4.83	1.66
	Response	919	5.28	1.63
	Total	2863	4.98	1.66
Parent Help with Homework	No Response	2145	3.13	1.48
	Response	937	3.87	1.22
	Total	3082	3.36	1.45
Parental Warmth	No Response	2144	3.91	0.68
	Response	938	4.18	0.63
	Total	3082	3.99	0.68
Income Needs Ratio	No Response	2048	3.61	5.22
	Response	862	3.18	2.56
	Total	2910	3.49	4.60

Measures

Homework Completion. The primary outcome of interest was the consistency with which youth completed their math and reading homework. These constructs were each assessed by a single item asking teachers "In general, does target child complete his/her math/reading homework?" (1997) or "In general, what percent of time does the target child complete his/her homework in math/reading?" (2002). Responses to the former question were binary (no/yes) while responses to the latter question ranged from 1% to 100% of the time. To standardize the variables across waves, responses to the latter were recoded into binary responses such that 1% to 50% reflected "no" and 51% to 100% reflected "yes". These cutoffs were chosen for both conceptual reasons, as more than 50% reflects a majority of the time, and statistical reasons, as the cumulative percentages of participants completing only their homework assignments 50% of the time or less was 19.1% for math and 13.4% for reading in 2002, which were comparable to the cumulative percentages of participants not generally completing their homework for math (14.1%) and reading (14.6%) in 1997. Teacher reports for this outcome were used to provide behavioral indicators independent of child and parent reports of predisposing factors.

Predictors of Regular Homework Completion. Predictor variables for the study included those measures that collectively are thought to directly impact homework completion behavior, including those that tap into the expectancy and value constructs, perception of subject difficulty, self-regulatory strength, assessed ability and parental help with homework. In addition, parental warmth was expected to be indirectly associated with homework completion and mediated by self-regulatory strength, and possibly expectancy and value constructs, and parental help with homework.

Prior to constructing scales for the expectancy and value constructs, principle components factor analyses using oblique rotation were conducted on items pertaining to each subject, with three factors – expectancy, value, and perceived difficulty – emerging (see Table 2 and Table 3 for results of math and reading factor analyses, respectively). However, given the theoretical rational for this study (i.e. that utility value in particular must be catalyzed by self-regulatory strength to be an effective impetus for homework completion), intrinsic value and utility value were separated into two distinct constructs.

Table 2.
Factor Loadings and Communalities for Ten Items Assessing Math Expectancy and Value

Item	Exp	Value	Diff	Com
How good at math are you?	.84			.68
Compared to other students in your math class, where would you put yourself?	.85			.66
Compared to your other school subjects, how good are you at math?	.70		-.22	.57
How well do you expect to do in math this year?	.60			.47
How good would you be at learning something new in math?	.56			.31
How hard is math for you?		.28	.56	.37
How useful is what you learn in math?		.77		.63
Being good at math is not important/very important?		.74		.57
Do you find working on math assignments very boring/very interesting?		.37	-.68	.69
How much do you like doing math?	.26	.32	-.65	.73

Table 3.
Factor Loadings and Communalities for Ten Items Assessing Reading Expectancy and Value

Item	Exp	Value	Diff	Com
How good at reading are you?	.85	-.06		.69
Compared to other students in your reading class, where would you put yourself?	.89	-.15		.71
Compared to your other school subjects, how good are you at reading?	.76	-.01		.59
How well do you expect to do in reading this year?	.61	.19		.50
How good would you be at learning something new in reading?	.61	.09		.43
How hard is reading for you?			.87	.77
How useful is what you learn in reading?		.73	.21	.55
Being good at reading is not important/very important?		.82		.63
Do you find working on reading assignments very boring/very interesting?	.24	.54	-.32	.58
How much do you like doing reading?	.37	.39	-.41	.62

Math/Reading Assessed Ability. Math and reading ability were each assessed by scores on subscales of the Woodcock-Johnson Revised Test of Achievement (WJ-R), Form B (Woodcock & Johnson, 1989). Specifically, math ability was assessed via standardized scores on

the applied problems subtest. Reading ability was assessed via the standardized scores on the letter-word identification and passage comprehension subtests, which were combined to create a broad reading score.

Math/Reading Expectancy. Math expectancy (α = .76) and reading expectancy (α = .81) were each youth-reported, five- item composite measures. Example items included "Compared to most of your school subjects, how good are you in math/reading?" and "How well do you expect to do in math/reading this year?" Responses ranged from 1 (a lot worse in math/reading than other subjects; not at all well) to 7 (a lot better in math/reading than other subjects; very well) with higher scores reflecting higher levels of expectancy in each subject. Notably, although perceived subject difficulty is generally included in this composite measure (Eccles & Wigfield, 1995), it was not included in the composite for this study due to its consistent loading on its own factor and because from a theoretical standpoint, perceived subject difficulty may not influence expectancy for youth who embrace incremental theories of intelligence (Dweck, 1986).

Perceived Subject Difficulty. Perceived math difficulty and perceived reading difficulty were each assessed by a single question asking youth "How hard is math/reading for you?" Responses ranged from 1 (not at all hard) to 7 (very hard), with higher scores reflecting more perceived subject difficulty.

Math/Reading Intrinsic Value. Math intrinsic value (α = .77) and reading intrinsic value (α = .73) were each youth-reported, two-item composite measures. Items included "Do you find working on math/reading assignments…?" and "How much do you like doing math/reading?" Responses ranged from 1 (very boring; not at all) to 7 (very interesting; very much) with higher scores reflecting higher levels of intrinsic value for each subject.

Math/Reading Utility Value. Math utility value and reading utility value were each assessed by a single item asking youth "How useful is what you learn in math/reading?" Responses ranged from 1 (not at all useful) to 7 (very useful), with higher scores reflecting higher levels of utility value for each subject.

Self-Regulatory Strength. Self-regulatory strength was a four-item composite measure (α = .76) asking parents to describe the frequency with which his or her child exhibited various behavioral markers of self-regulation. Example items included "He/she has difficulty concentrating, cannot pay attention for long." And "He/she is impulsive, or acts without thinking." Responses ranged from 1 (not true) to 3 (often true), and were reverse-coded such that higher scores reflect higher levels of self-regulatory strength.

Parent Help with Homework. Parent help with homework was assessed via a single item asking parents to report how frequently over the past month he/she "…worked on homework with him or her?" Responses ranged from 1 (not in the past month) to 5 (every day). Higher scores reflect higher levels of parent help with homework.

Parental Warmth. Parental warmth was assessed via a parent-reported, six-item measure (α = .82). Example items include "About how often in the past month have you…hugged or shown physical affection to your child?" and "…talked with him/her about things he/she is especially interested in?" Responses ranged from 1 (not in the past month) to 5 (every day). Higher scores reflect higher levels of parental warmth.

Youth and Family Covariates. In order to control for potentially confounding variables and to test for moderation, demographic variables were included in the model. Child-level variables included age in months, grade level (1 through 8), gender (0 = female, 1 = male) and race (0 = African American, 1 = European American). In addition, poverty status, a dichotomous

variable based on the income-needs ratio calculated from family income and the corresponding Census needs standard for that year (0 = at or below poverty threshold, 1 = above poverty threshold) was included as well.

Analytic Approach

In order to address the research questions of interest, multiple-group path analyses adjusted for PSID sample weights were conducted using M-PLUS. In addition, to account for non-independence of poverty status between siblings, clustering by family was employed during model estimation. Full information maximum likelihood (FIML) was used to account for missing data. Furthermore, because MLR estimators are robust to non-normality (Muthén & Muthén, 1998–2012), they were used to estimate the models.

Although logistic regression is most adequate in the case of a categorical outcome, a linear regression model in which the dichotomous homework variable was treated as a continuous variable was first employed so as to assess model fit and aid in the interpretation of significant pathways. The chi-square statistic (χ^2), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) were all employed as indicators of overall model fit. It is generally accepted that good model fit is evident when he $\chi 2$ statistic is non-significant, however this general rule of thumb is less applicable with sample sizes above 400 because the test will often be statistically significant even with trivial misfit (Kenny, 2014). As such, it was given less weight in interpreting model fit than the latter three indicators, which are not as sensitive to sample size. Good model fit is further evident when the CFI is greater than .90 and when the RMSEA and SRMR values are below .06 with an upper-bound confidence interval below .10 (Hu & Bentler, 1999). In addition to tests of model fit, Sobel tests were conducted to test for mediation from parental warmth to

homework completion via self-regulatory strength and possibly expectancy, value and parent help with homework.

Upon confirming the best-fitting models explaining both math and reading homework completion, multi-group path analyses comparing 1) European American vs. African American youth and 2) low poverty vs. high poverty youth were estimated to explore whether these demographic variables of interest moderated any of the pathways in either of the overall models. In addition, logistic models were run for each of the homework completion outcomes in an effort to confirm robustness of the pattern of findings from the linear regression models.

Chapter 4: Results

Descriptive statistics and corresponding ANOVA results by general homework completion (bifurcated "yes" or "no") for the variables of interest in the samples used for math homework analyses and reading homework analyses can be found in Table 4 and Table 5, respectively. Within the math homework sample, the difference in the means of all predictors was either significant or approaching significance in the expected direction. Conversely, within the reading homework sample, only self-regulatory strength, the Woodcock-Johnson Broad Reading score and parental warmth differed significantly between students who generally complete their homework, and those who do not.

Table 4.
Means, Standard Deviations, Ranges and Percent Missing of Variables in Math Homework Analyses (n=489)

Variable	HW *M (SD)*	No HW *M (SD)*	Total *M (SD)*	Min	Max	% Missing
Self-Regulatory Strength	2.56 (0.48)	2.26 (0.57)**	2.51 (0.50)	1	3	0.00%
W-J Applied Problems	110.16 (16.58)	98.77 (13.62)**	108.36 (16.61)	32	154	1.24%
Math Intrinsic Value	5.07 (1.76)	4.46 (1.91)**	4.96 (1.79)	1	7	1.03%
Math Expectancy	5.15 (1.09)	4.55 (1.37)**	5.05 (1.16)	1	7	0.82%
Math Utility Value	5.74 (1.62)	5.35 (1.95)$^{+}$	5.66 (1.69)	1	7	0.82%
Math Perceived Difficulty	4.94 (1.66)	5.31 (1.55)$^{+}$	5.00 (1.64)	1	7	0.82%
Parent Help with HW	3.95 (1.14)	3.64 (1.26)*	3.90 (1.16)	1	5	0.20%
Parental Warmth	4.26 (0.61)	3.87 (.77)**	4.20 (0.65)	1.29	5	0.00%
% Completing Math HW			83.8%	0	1	1.00%

** $p < .01$, * $p < .05$, $^{+}$ $p < .10$

Table 5.
Means, Standard Deviations, Ranges and Percent Missing of Variables in Reading Homework Analyses (n=706)

Variable	HW *M (SD)*	No HW *M (SD)*	*M (SD)/%*	Min	Max	% Missing
Self-Regulatory Strength	2.55 (0.49)	2.24 (0.50)**	2.51 (0.50)	1	3	0.00%
W-J Broad Reading	107.40 (16.22)	94.47 (17.24)**	105.53 (16.90)	0	149	1.56%
Read Intrinsic Value	5.24 (1.62)	5.40 (1.68)	5.27 (1.62)	1	7	2.27%
Read Expectancy	5.48 (1.07)	5.30 (1.25)	5.46 (1.10)	2.2	7	2.27%
Read Utility Value	5.80 (1.53)	5.52 (1.85)	5.77 (1.59)	1	7	2.27%
Read Perceived Difficulty	4.67 (2.07)	4.68 (2.18)	4.66 (2.09)	1	7	2.27%
Parent Help with HW	3.92 (1.19)	3.72 (1.34)	3.90 (1.21)	1	5	0.14%
Parental Warmth	4.22 (0.60)	3.98 (0.78)**	4.18 (0.63)	1.29	5	0.00%
% Completing Read HW			84.7%	0	1	1.30%

** $p < .01$, * $p < .05$, $^{+}$ $p < .10$

Correlations for the variables of interest in the sample used for math homework analyses (below the diagonal) and reading analyses (above the diagonal) can be found in Table 6. Consistent with expectations, patterns across both math and reading suggest that standardized test scores, self-regulatory strength, and parental warmth are positively linked with homework completion, although the magnitude of these associations is small (r = .098 - .268). In a similar vein, demographic covariates including poverty status, race, and gender are also linked with homework completion in both subjects, such that non-poor students, European American students, and females are generally more likely to complete homework assignments. Neither perceived difficulty nor utility value are associated with homework completion in either subject, however expectancy and intrinsic value are positively associated with completion of math homework but not reading homework. Likewise, parent help with homework is positively associated with math homework but not reading homework.

Table 6.

Correlations for Variables in Math Homework Analyses (n = 489) and Reading Homework Analyses (n = 706)

	Reading Variables											
Math Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Homework Completion	-	.268**	.060	-.002	-.034	.063	.217**	.055	.131**	-.130**	.225**	.171**
2. Woodcock-Johnson	.248**	-	.280**	.046	.023	.127**	.257**	-.088*	.132**	-.109**	.346**	.247**
3. Expectancy	.187**	.239**	-	.094*	.532**	.278**	.031	-.064	.094*	-.159**	-.072	-.018
4. Perceived Difficulty	-.081	.043	.055	-	-.029	.094*	.103**	-.217**	.138**	-.092*	.054	.048
5. Intrinsic Value	.122**	.040	.524**	.018	-	.253**	.001	.116**	.045	-.128**	-.166**	-.111**
6. Utility Value	.083	.098*	.229**	.069	.205**	-	.057	.056	.184**	-.029	.004	.036
7. Self-Regulatory Strength	.216**	.226**	.098*	.008	.056	.032	-	-.012	.126**	-.208**	.111**	.079*
8. Parent Help with Homework	.098*	-.093*	.010	-.091*	.092*	.091*	-.022	-	.245**	.064	-.098**	.011
9. Parental Warmth	.218**	.172**	.093*	.105*	.068	.146**	.153**	.244**	-	-.148**	.189**	.085*
10. Gender (1 = Male)	-.107*	.060	.026	.023	.010	.088	-.207**	.030	-.134**	-	-.038	.090*
11. Race (1=White)	.230**	.424**	-.052	-.010	-.254**	-.012	.124**	-.117**	.224**	-.086	-	.340**
12. Poverty Status (1=Nonpoor)	.212**	.246**	-.002	-.090	-.078	-.079	.073	.010	.066	-.003	.338**	-

*Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Mean Level Differences in Predictor Variables Across Race and Poverty Status

In order to explore whether there were mean differences in the expectancy, value, and self-regulatory strength constructs across racial and poverty status groups, an analysis of variance was conducted for the entire sample of students who had a teacher respond that they had the student for either math or reading (see Table 7). Consistent with hypotheses, self-regulatory strength was higher for European American and low poverty (above poverty threshold) students. In addition, there were no differences in expectancy or utility value across groups. There were significant differences in both math and reading intrinsic value across groups, however African American students and high poverty (below poverty threshold) students reported *higher* levels of intrinsic motivation than European American and low poverty students. Notably, African Americans and high poverty (below poverty threshold) students reported higher levels of perceived difficulty in math. Finally, African Americans and high poverty (below poverty threshold) students had significantly lower ability measured by Woodcock-Johnson scores in both math and reading.

Table 7.
Means and Standard Deviations for Expectancy, Value and Self-Regulatory Strength (n = 893)

Variable	European American *M (SD)*	African American *M (SD)*	Above Poverty Threshold *M (SD)*	Below Poverty Threshold *M (SD)*
Self-Regulatory Strength	2.52 (0.51)*	2.45 (0.52)*	2.51 (0.51)$^{+}$	2.41 (0.55)$^{+}$
W-J Applied Problems	113.61 (15.75)**	100.30 (14.15)**	109.92 (16.32)**	100.33 (15.02)**
Math Intrinsic Value	4.67 (1.75)**	5.31 (1.69)**	4.83 (1.73)*	5.22 (1.86)*
Math Expectancy	5.04 (1.10)	5.05 (1.13)	5.04 (1.10)	5.04 (1.18)
Math Utility Value	5.58 (1.58)	5.65 (1.76)	5.59 (1.65)	5.79 (1.70)
Math Perceived Difficulty	4.49 (1.75)$^{+}$	4.72 (1.85)$^{+}$	4.45 (1.79)*	4.83 (1.92)*
W-J Broad Reading	110.56 (15.57)**	98.69 (17.15)**	107.91 (16.23)**	95.35 (19.68)**
Read Intrinsic Value	5.06 (1.64)**	5.58 (1.58)**	5.18 (1.62)**	5.74 (1.48)**
Read Expectancy	5.39 (1.09)	5.51 (1.10)	5.44 (1.10)	5.46 (1.07)
Read Utility Value	5.83 (1.45)	5.75 (1.76)	5.80 (1.55)	5.69 (1.79)
Read Perceived Difficulty	4.78 (1.99)	4.62 (2.19)	4.65 (2.09)	4.50 (2.18)

** $p < .01$, * $p < .05$, $^{+}$ $p < .10$

Path Analyses

Linear regression path models including all predictors of homework completion, youth and family covariates, and an interaction term between utility value and self-regulatory strength were estimated for both math homework completion and reading homework completion. Initial fit indices indicated poor overall model fit for both math, ($\chi^2_{(56)}$ = 445.63, p < .001; RMSEA = .127, 90% CI = .1216 - .138; CFI = .211; SRMR = .112) and reading ($\chi^2_{(56)}$ = 792.97, p < .001; RMSEA = .14, 90% CI = .135 - .153; CFI = .202; SRMR = .104). Thus modification indices, in conjunction with my theoretical rationale, were employed to add correlations between appropriate variables. The resulting models for math $\chi^2_{(43)}$ = 81.07, p < .001; RMSEA = .043, 90% CI = .028 - .057; CFI = .927; SRMR = .052) and reading ($\chi^2_{(44)}$ = 98.51, p < .001; RMSEA = .042, 90% CI = .031 - .054; CFI = .914; SRMR = .049) exhibited model fit indices within acceptable overall model fit.

To confirm the patterns found in the linear regression models, logistic regression models were then run for each of the outcomes. Given the complexity of the models however, convergence difficulties were encountered. Subsequently, covariates were removed from the models iteratively until each of the models was sufficiently reduced in complexity to allow for convergence. In an effort to confirm the robustness of patterns found among those variables that remained in both the original full linear regression models and the partial logistic regression models, the linear regression models were rerun reduced to those variables remaining in the logistic regression models. Results for each of these three model estimates for math homework completion can be found in Table 8, while corresponding results for reading homework completion can be found in Table 9. Full linear model results are illustrated in Figure 8 for math and Figure 9 for reading.

Table 8.
Math Weighted Standardized FIML Estimates for Direct and Indirect Path Models

	Math Homework Completion			
	Model 1 Full Linear	Model 2 Partial Logistic		Model 3 Partial Linear
	B (SE)	L.O. (SE)	Odds Ratio	*B* (SE)
Direct Paths				
Woodcock → HW	.09 (.06)			
Expect → HW	.21 (.10)*	.29 (.06)**	1.34	.21 (.08)**
Intrinsic → HW	.02 (.07)			
Utility (C) → HW	.06 (.05)	.02 (.04)		.03 (.05)
Difficulty → HW	-.03 (.05)			
Self Reg (C) → HW	.14 (.06)*	.56 (.15)**	1.75	.20 (.06)**
Utility X Self Reg → HW	-.11 (.06)*	-.16 (.08)*	1.17	-.13 (.06)*
Help HW → HW	.04 (.06)	.03 (.08)		.03 (.05)
Warmth → HW	.09 (.06)	.40 (.14)**	1.49	.15 (.06)*
Grade → HW	-.10 (.06)$^{+}$			
Gender (1=Male) → HW	-.10 (.05)$^{+}$			
Race (1 = White) → HW	.13 (.06)*			
Pov (1 = Above) → HW	.16 (.07)*			
Warmth → Self Reg (C)	.18 (.05)**	.16 (.04)**	1.17	.18 (.05)**
Warmth → Woodcock	-4.26 (1.66)*			
Warmth → Expect	-.02 (.06)	-.04 (.13)		-.02 (.06)
Warmth → Intrinsic	.01 (.05)			
Warmth → Utility	.09 (.05)$^{+}$	.25 (.15)$^{+}$	1.28	.09 (.05)
Warmth → Difficulty	.13 (.05)*			
Warmth → Help HW	.20 (.05)**	.40 (.11)**	1.49	.20 (.06)**
Indirect Paths				
Warmth → Self Reg → HW	.02 (.01)$^{+}$	.09 (.03)**	1.09	.04 (.02)*
Warmth → Woodcock → HW	-.38 (.30)			
Warmth → Expect → HW	.00 (.01)	-.01 (03)		-.00 (.01)
Warmth → Intrinsic→ HW	.00 (.00)			
Warmth → Utility → HW	.01 (.01)	.00 (.01)		.00 (.01)
Warmth → Difficulty → HW	-.00 (.01)			
Warmth → Help HW → HW	.01 (.01)	.01 (.03)		.01 (.01)

** p < .01, * p < .05, $^{+}$ p < .10

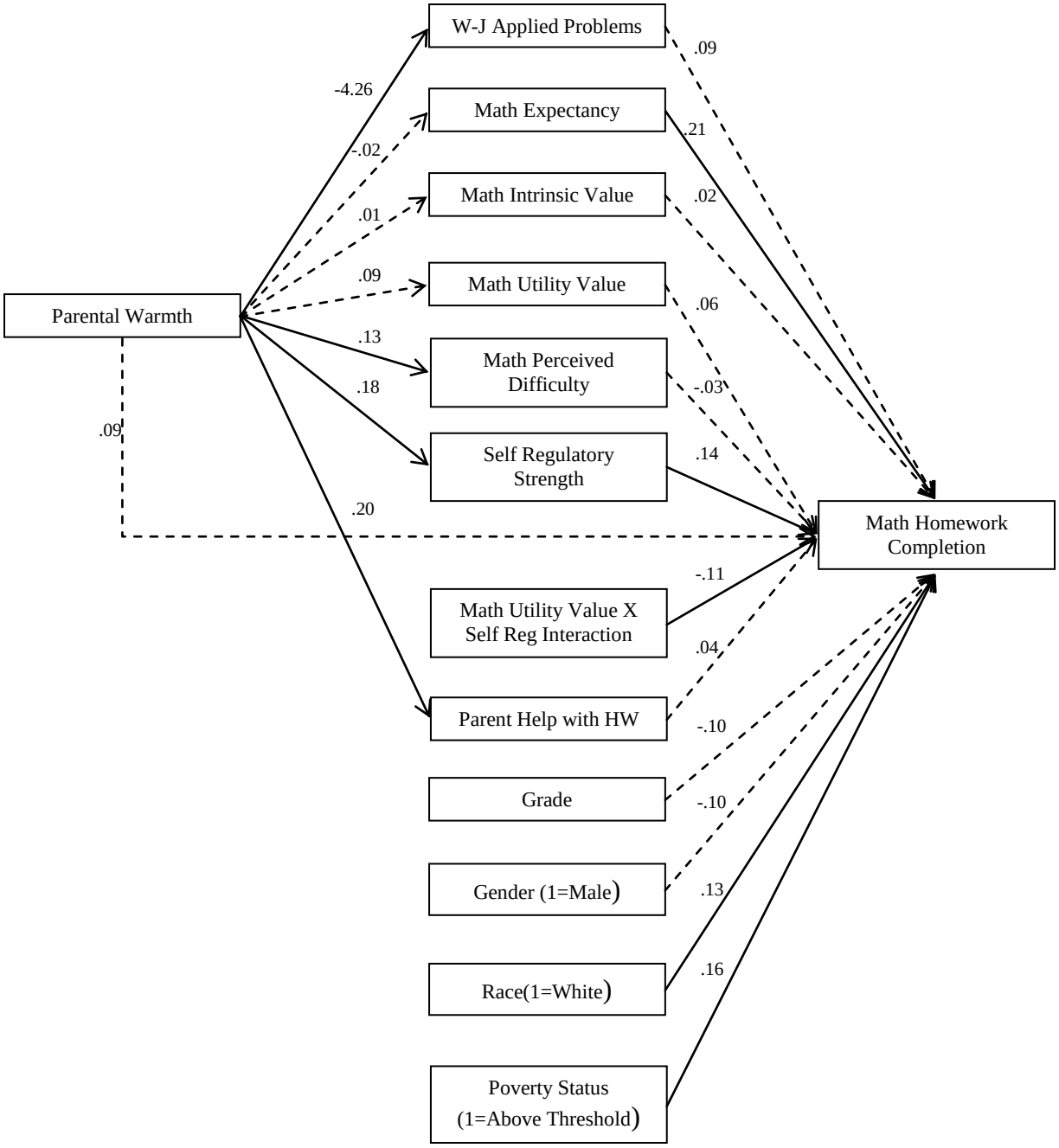
Table 9.

Reading Weighted Standardized FIML Estimates for Direct and Indirect Path Models

	Reading Homework Completion			
	Model 4 Full Linear	Model 5 Partial Logistic		Model 6 Partial Linear
	B (SE)	L.O. (SE)	Odds Ratio	*B* (SE)
Direct Paths				
Woodcock → HW	.16 (.05)**	.03 (.00)**	1.03	.25 (.05)**
Expect → HW	.04 (.06)			
Intrinsic → HW	.02 (.05)			
Utility (C) → HW	-.03 (.04)	.03 (.04)		-.02 (.04)
Difficulty → HW	-.03 (.04)			
Self Reg (C) → HW	.14 (.05)**	.48 (.13)**	1.61	.16 (.05)**
Utility X Self Reg → HW	.08 (.04)$^{+}$	.12 (.08)$^{+}$	1.13	.06 (.05)
Help HW → HW	.13 (.06)*	.18 (.06)**	1.20	.14 (.06)*
Warmth → HW	-.02 (.05)	.02 (.13)		.01 (.05)
Grade → HW	-.04 (.04)			
Gender (1=Male) → HW	-.04 (.04)			
Race (1 = White) → HW	.17 (.06)**			
Pov (1 = Above) → HW	.10 (.06)$^{+}$			
Warmth → Self Reg (C)	.13 (.05)*	.11 (.04)**	1.12	.13 (.05)*
Warmth → Woodcock	.12 (.05)*	3.07 (1.25)*	21.54	.12 (.05)*
Warmth → Expect	.12 (.04)**			
Warmth → Intrinsic	.06 (.05)			
Warmth → Utility	.15 (.05)**	.40 (.11)**	1.49	.15 (.05)**
Warmth → Difficulty	.12 (.05)*			
Warmth → Help HW	.23 (.05)**	.48 (.10)**	1.62	.23 (.05)**
Indirect Paths				
Warmth → Self Reg → HW	.02 (.01)$^{+}$	.05 (.02)*	1.05	.02 (.01)$^{+}$
Warmth → Woodcock → HW	.02 (.01)*	.09 (.04)*	1.09	.03 (.01)*
Warmth → Expect → HW	.01 (.01)			
Warmth → Intrinsic→ HW	.00 (.00)			
Warmth → Utility → HW	-.00 (.01)	.01 (.02)		-.00 (.01)
Warmth → Difficulty → HW	-.00 (.01)			
Warmth → Help HW → HW	.03 (.01)*	.09 (.03)*	1.09	.03 (.02)*

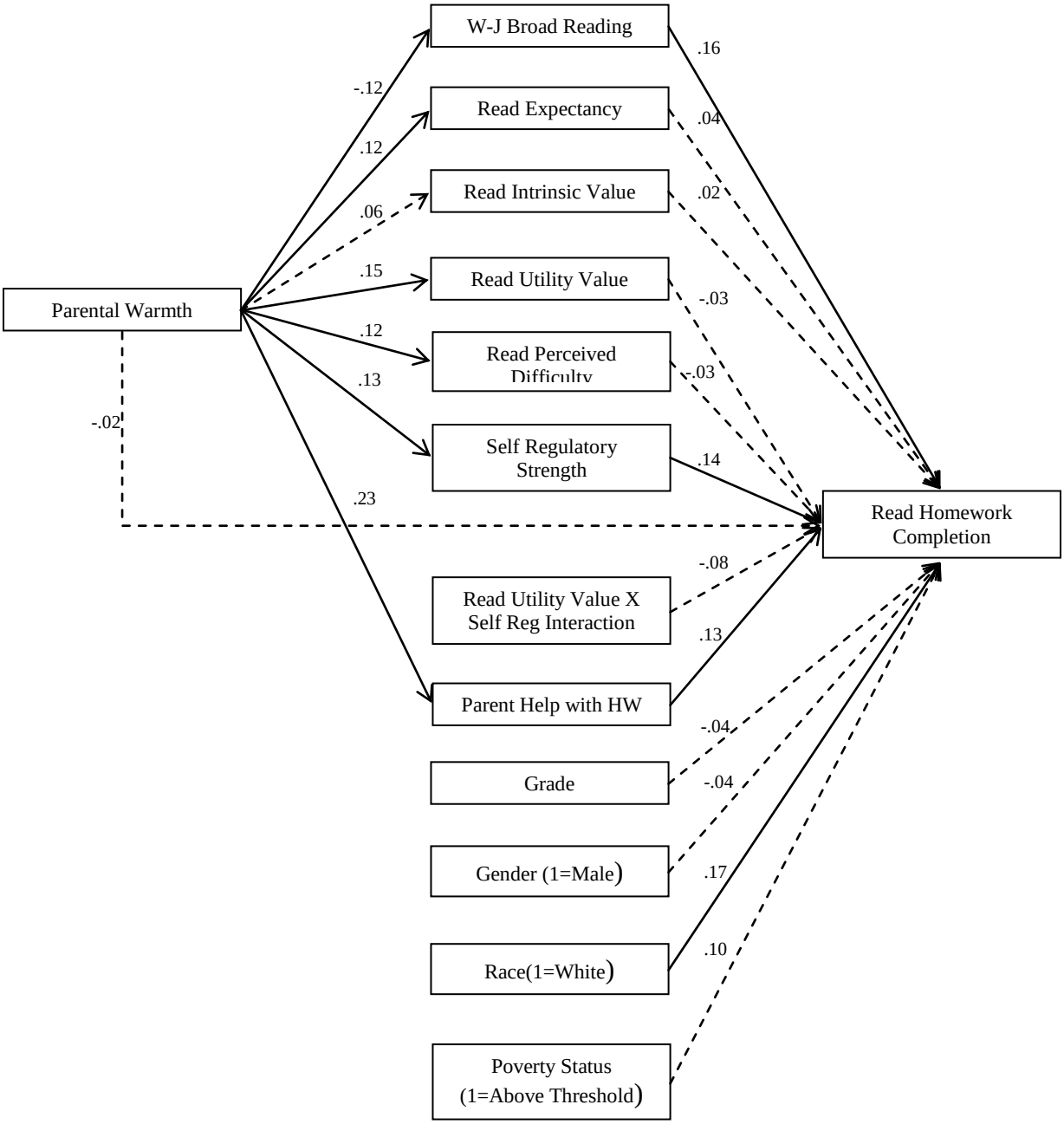
** $p < .01$, * $p < .05$, $^{+}$ $p < .10$

Figure 8. Path Model for Math Homework Completion



Note: The solid line represents path coefficients that are significant at .05.

Figure 9. Path Model for Reading Homework Completion



Note: The solid line represents path coefficients that are significant at .05.

Direct Paths. Several patterns were evident across both models. In particular, self-regulatory strength was a comparatively strong predictor of both math and reading homework, as a one standard deviation increase in self-regulatory strength was responsible for a .14 standard deviation increase in homework completion for both subjects. Logistic regression results also reveal this relationship, as the impact of a one-unit increase in self-regulatory strength increases the odds of math homework completion by a factor of 1.75 and reading homework completion by 1.61. Similarly, race remained a comparatively strong predictor of homework completion, even after controlling for self-regulatory strength. European Americans had a .13 standard deviation higher score in math homework completion and a .18 standard deviation higher score in reading homework completion than African Americans. Poverty status was a significant predictor for math homework, as being above the poverty threshold was associated with a .17 standard deviation higher score in math homework than being below the poverty threshold. For reading homework, being above the poverty threshold was associated with a .10 standard deviation higher score, however this association was only approaching significance. Neither intrinsic value, utility value, perceived subject difficulty, parental warmth, grade in school, nor gender were significant predictors of homework completion for either subject.

Other paths were less consistent across domains. For math homework, expectancy was a significant and comparatively strong predictor as a one standard deviation increase was associated with a .21 standard deviation increase in homework completion. Logistic regression indicates that a one-unit increase in expectancy increases the odds of math homework completion by a factor of 1.34. However, expectancy was not a significant predictor of reading homework completion. Conversely, the Woodcock-Johnson broad reading score was a significant predictor, as one standard deviation increase was associated with a .16 standard

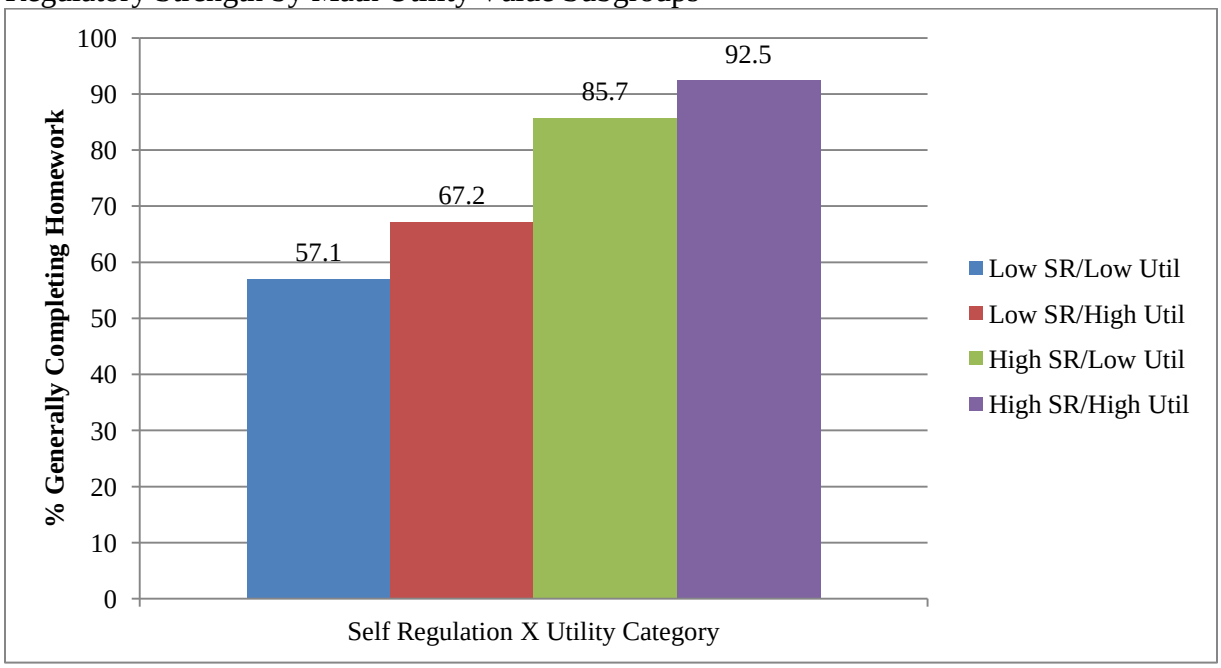
deviation increase in reading homework completion, or an increase in odds by a factor of 1.03 for each one-unit increase, whereas the Woodcock-Johnson applied problems score was not a significant predictor of math homework completion. In a similar vein, parent help with homework was a significant predictor for reading homework but not for math homework. Specifically, a one standard deviation increase in parent help with homework was associated with a .13 standard deviation increase in reading homework. Logistic regression results indicate that a one-unit increase in parent help with homework increases the odds of reading homework completion by a factor of 1.20.

Although parental warmth was not directly associated with homework completion, it had statistically significant links with several predictors of homework completion across both models. In particular, it was positively associated with self-regulatory strength, perceived subject difficulty, utility value and help with homework in both models. It was also associated with Woodcock-Johnson standardized scores in both models, however the relationship was *negative* for math homework and *positive* for reading homework. Finally, it was positively associated with expectancy for reading homework, but had no significant association with expectancy for math homework. It was not predictive of intrinsic value in either model.

An interaction between utility value and self-regulatory strength was a significant predictor for math homework completion and was approaching significance for reading homework completion. In order to explore the nature of these interactions, four subgroups were created in which self-regulatory strength was crossed with utility value. Specifically, within each subject, youth who had high (one standard deviation above the mean) or low (one standard deviation below the mean) levels on self-regulatory strength were crossed with youth who had similarly high or low levels of utility value.

The nature of the interaction for math was not consistent with my hypothesis (see Figure 10). The percentage of students completing their math homework who *both* reported high math utility value *and* had high levels of self-regulatory strength was much higher (92.5%) than the percentage of students who reported high math utility value but had low levels of self-regulatory strength (67.2%), suggesting that indeed, utility value alone may not be sufficiently motivating to put forth effort and self-regulation may need to "catalyze" this motivation. However, the percentage of students completing their math homework who had *low* utility but *high* self-regulatory strength remained only slightly lower (85.7%) than those who had *high* math utility value *and high* self-regulatory strength (92.5%) with a difference of only 6.8% within the high self-regulatory strength subgroups. In other words, self-regulatory strength is a strong predictor of math homework completion regardless of the levels of utility value, which contradicts the hypothesis that high levels of *both* components are necessary to catalyze achievement-related effort. Furthermore, the percentage of students completing their math homework who had *low* self-regulatory strength *and low* math utility value was comparatively lower (57.1%) than the group with *low* self-regulatory strength but *high* math utility value (67.2%), with a difference of 10.1% within the low self-regulatory strength subgroups. This suggests that math utility value matters *more* for math homework completion among students with low self-regulatory strength than among those with high self-regulatory strength – a result that is clearly inconsistent with the hypothesis that utility value is ineffective under conditions of low self-regulatory strength.

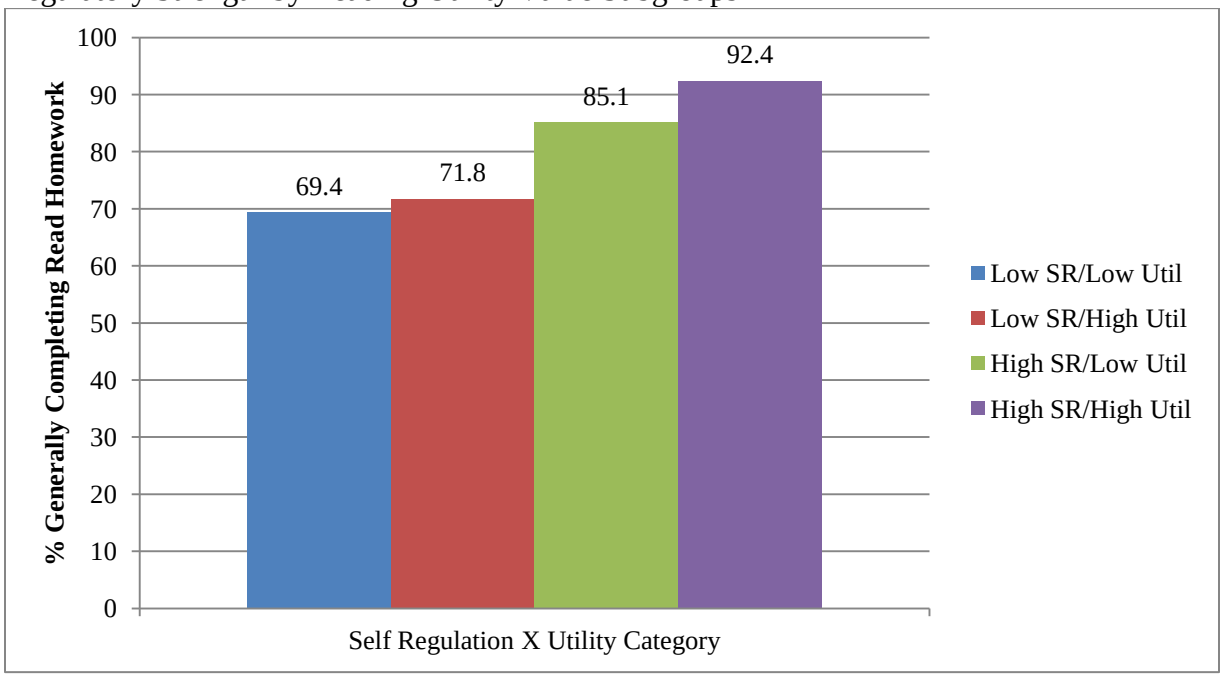
Figure 10. Percent of Students Who Generally Complete Math Homework within Self-Regulatory Strength by Math Utility Value Subgroups



The nature of the interaction for reading was comparatively more consistent with hypotheses but not significant (see Figure 11). The percentage of students completing their reading homework who *both* reported high reading utility value *and* had high levels of self-regulatory strength was higher (92.4%) than the percentage of students who reported *high* reading utility value but had *low* levels of self-regulatory strength (71.8%), again suggesting that indeed, utility value alone may not be sufficiently motivating to put forth effort and self-regulation may need to "catalyze" this motivation. As was the case with math homework, however, the percentage of students completing their reading homework who had *low* utility but *high* self-regulatory strength remained only slightly lower (85.1%) than those who had *high* reading utility value *and high* self-regulatory strength (92.4%) with a difference of only 7.3% within the high self-regulatory strength subgroups, confirming again the main effect of self-regulatory strength.

Unlike with math homework completion, the percentage of students completing their reading homework who had *low* self-regulatory strength *and low* reading utility value was very similar (69.4%) to the group with *low* self-regulatory strength but *high* reading utility value (71.8%), with a difference of only 2.4% within the low self-regulatory strength subgroups. Thus, consistent with my hypothesis, low versus high levels of reading utility value does not appear to matter under conditions of low self-regulatory strength.

Figure 11. Percent of Students Who Generally Complete Reading Homework within Self-Regulatory Strength by Reading Utility Value Subgroups



Indirect Paths. The path from parental warmth → self-regulatory strength → homework completion was approaching significance for both math and reading homework completion. No other indirect paths were significant for math homework completion. However, two additional indirect paths from parental warmth to reading homework completion were evident, including 1) parental warmth → Woodcock-Johnson broad reading score → reading homework completion and 2) parental warmth → parent help with homework → reading homework completion.

Multigroup Model Comparisons

In an effort to confirm similarities in pathways as a function of both race and poverty status for math and reading, several nested models were tested: in one model all pathways were constrained to be identical in the population; this was compared to another model with no constraints across groups of the regression parameters (baseline model). The resulting chi square difference test was used to determine whether processes differed between European American and African American youth, as well as between non-poor youth (above poverty threshold) and poor youth (below poverty threshold). Comparative model estimates for math homework can be found in Table 10 while comparative model estimates for reading homework can be found in Table 11. Results from the chi square difference tests for math homework comparing European American youth to African American youth were not significant, ($\chi^2_{(18)} = 16.50$, $p = .56$), indicating that race did not moderate relationships between predictor variables and math homework outcomes. Similarly, results indicated no difference between poor and non-poor youth with respect to predictors of math homework ($\chi^2_{(18)}= 17$, $p = .52$). For reading homework, results from the chi square difference test comparing European American youth to African American youth was significant ($\chi^2_{(18)} = 36.12$, $p = .01$), indicating that processes differ as a function of race for reading homework. Finally, results indicated no difference between poor and non-poor youth with respect to predictors of reading homework ($\chi^2_{(18)} = 22.21$, $p = .22$). Thus, only one of the four multigroup comparisons, reading as a function of race, indicated a difference in path analyses by subgroup.

To explore which coefficients differed as a function of race for reading homework, Wald Chi-square tests of specific pathways of interest were conducted. Notably, there were no group differences in the core components of the expectancy-value model. However, group differences

emerged in the pathways from parent help with homework to reading homework completion $\chi^2_{(1)} = 3.97$, $p = .05$, from gender to reading homework completion $\chi^2_{(1)} = 6.86$, $p = .01$, and from parental warmth to help with homework $\chi^2_{(1)} = 6.07$, $p = .01$. Specifically, help with homework is a significant predictor of reading homework among African American students, as a one-unit increase in parent help with homework is associated with a .23 standard deviation higher score in reading homework completion. Conversely, help with homework was not a significant predictor of reading homework completion for European American students. Likewise, gender is predictive of reading homework completion for African Americans such that males are more likely to complete their homework than female, although the magnitude of this relationship is incredibly small (.003 standard deviation higher). Finally, parental warmth is a significant predictor of help with homework for European American students, as a one-unit increase is associated with a .30 standard deviation higher score in reading homework completion. There was no significant association between parental warmth and help with homework for African American students however.

Table 10.
Math Homework Multigroup Comparisons with Weighted Standardized FIML Estimates for Direct and Indirect Path Models

	Math Homework Completion			
	Model 7 European American *B* (SE)	Model 8 African American *B* (SE)	Model 9 Above Poverty *B* (SE)	Model 10 Below Poverty *B* (SE)
Direct Paths				
Woodcock → HW	.07 (.08)	.07 (.10)	.14 (.06)*	-.03 (.16)
Expect → HW	.27 (.13)*	.11 (.13)	.14 (.08)$^{+}$	-.07 (.17)
Intrinsic → HW	.02 (.10)	-.02 (.11)	.04 (.06)	.14 (.17)
Utility (C) → HW	.11 (.07)	-.01 (.08)	.05 (.06)	.06 (.11)
Difficulty → HW	.05 (.07)	-.03 (.10)	.03 (.05)	-.17 (.09)$^{+}$
Self Reg (C) → HW	.14 (.09)	.23 (.09)**	.17 (.07)*	.32 (.11)**
Utility X Self Reg → HW	.17 (.08)*	-.05 (.08)	-.09 (.08)	-.22 (.10)*
Help HW → HW	.01 (.07)	.13 (.10)	.06 (.06)	.12 (.12)
Warmth → HW	.07 (.07)	.13 (.10)	.11 (.07)	.05 (.12)
Grade → HW	-.11 (.08)	-.08 (.11)	-.15 (.08)*	-.03 (.17)
Gender (1=Male) → HW	-.08 (.07)	.00 (.00)	-.07 (.06)	.01 (.00)*
Race (1 = White) → HW			.18 (.07)**	.19 (.16)
Pov (1 = Above) → HW	.15 (.09)	.12 (.09)		
Warmth → Self Reg (C)	.21 (.06)**	.01 (.09)	.16 (.06)**	.19 (.10)$^{+}$
Warmth → Woodcock	-5.42 (3.02)$^{+}$	-2.92 (1.12)**	-3.48 (1.23)**	-7.25 (12.08)
Warmth → Expect	-.03 (.07)	.11 (.09)	.01 (.06)	.11 (.09)
Warmth → Intrinsic	.08 (.07)	.05 (.09)	.01 (.06)	.21 (.11)$^{+}$
Warmth → Utility	.11 (.06)$^{+}$	.09 (.09)	.09 (.06)	.31 (.08)**
Warmth → Difficulty	.12 (.07)$^{+}$	.19 (.07)**	.15 (.06)$^{+}$	.09 (.11)
Warmth → Help HW	.26 (.07)**	.19 (.10)$^{+}$	.23 (.06)**	.10 (.13)
Indirect Paths				
Warmth → Self Reg → HW	-.03 (.02)	.00 (.02)	.03 (.02)	.06 (.04)
Warmth → Woodcock → HW	-.34 (.46)	-.19 (.29)	-.50 (.30)$^{+}$	.20 (.19)
Warmth → Expect → HW	-.01 (.02)	.01 (.02)	.00 (.01)	-.01 (.02)
Warmth → Intrinsic→ HW	.00 (.01)	-.00 (.00)	.00 (.00)	.03 (.04)
Warmth → Utility → HW	.01 (.01)	-.00 (.01)	.00 (.01)	.02 (.04)
Warmth → Difficulty → HW	-.01 (.01)	-.00 (.02)	.01 (.01)	-.02 (.02)
Warmth → Help HW → HW	.00 (.02)	.02 (.02)	.01 (.01)	.01 (.02)

** $p < .01$, * $p < .05$, $^{+}$ $p < .10$

Table 11.
Reading Homework Multigroup Comparisons with Weighted Standardized FIML Estimates for Direct and Indirect Path Models

	Reading Homework Completion			
	Model 11 European American *B* (SE)	Model 12 African American *B* (SE)	Model 13 Above Poverty *B* (SE)	Model 14 Below Poverty *B* (SE)
Direct Paths				
Woodcock → HW	.14 (.06)*	.17 (.07)*	.15 (.06)*	.11 (.12)
Expect → HW	.07 (.08)	.02 (.07)	-.02 (.07)	.25 (.14)$^{+}$
Intrinsic → HW	.01 (.06)	.10 (.09)	.07 (.05)	-.20 (.13)
Utility (C) → HW	-.09 (.06)	.09 (.07)	-.03 (.05)	.08 (.12)
Difficulty → HW	-.05 (.05)	.01 (.09)	-.02 (.04)	-.30 (.11)**
Self Reg (C) → HW	.14 (.06)*	.24 (.06)**	.16 (.05)**	.15 (.12)
Utility X Self Reg → HW	.10 (.06)$^{+}$	.09 (.07)	.05 (.05)	.20 (.11)
Help HW → HW	.08 (.06)	.23 (.10)*	.08 (.07)	.14 (.12)
Warmth → HW	.00 (.05)	-.01 (.08)	.01 (.06)	.01 (.11)
Grade → HW	-.07 (.05)	.03 (.07)	-.06 (.05)	.16 (.14)
Gender (1=Male) → HW	.00 (.05)	.00 (.00)*	-.02 (.04)	.00 (.00)*
Race (1 = White) → HW			.20 (.07)**	.28 (.12)*
Pov (1 = Above) → HW	.09 (.07)	.07 (.08)		
Warmth → Self Reg (C)	.14 (.06)*	.00 (.07)	.10 (.05)$^{+}$	.33 (.13)*
Warmth → Woodcock	.05 (.06)	.09 (.07)	.10 (.05)$^{+}$	.01 (.20)
Warmth → Expect	.16 (.05)**	.05 (.08)	.13 (.05)**	.19 (.12)
Warmth → Intrinsic	.09 (.06)$^{+}$	.03 (.09)	.07 (.05)	.14 (.17)
Warmth → Utility	.18 (.06)**	.09 (.07)	.14 (.05)**	.32 (.13)*
Warmth → Difficulty	.12 (.05)*	.09 (.09)	.14 (.05)**	.21 (.10)*
Warmth → Help HW	.30 (.05)**	.06 (.10)	.27 (.05)**	.11 (.11)
Indirect Paths				
Warmth → Self Reg → HW	.02 (.01)	.00 (.02)	.02 (.01)	.05 (.05)
Warmth → Woodcock → HW	.01 (.01)	.02 (.01)	.01 (.01)	.00 (.02)
Warmth → Expect → HW	.01 (.01)	.00 (.00)	-.00 (.01)	.05 (.04)
Warmth → Intrinsic→ HW	.00 (.01)	.00 (.01)	.01 (.01)	-.03 (.04)
Warmth → Utility → HW	-.02 (.01)	.01 (.01)	-.00 (.01)	.02 (.04)
Warmth → Difficulty → HW	.01 (.01)	.00 (.01)	-.00 (.01)	-.06 (.04)
Warmth → Help HW → HW	.02 (.02)	.02 (.02)	.02 (.02)	.02 (.02)

** $p < .01$, * $p < .05$, $^{+}$ $p < .10$

Chapter 5: Discussion

Despite efforts aimed at its elimination, the gap in academic achievement between Black and White youth, as well as low and high-income youth, has remained a persistent social issue in the history of the United States for decades. The achievement gap is tightly associated with a variety of other social issues such as adult employment, poverty, crime and public health outcomes (Holzer et al., 2007), indicating that the importance of narrowing the gap has implications that reach well beyond youth in their school years. As the U.S. economy has grown increasingly reliant on a well-educated workforce, these repercussions have only become increasingly severe, suggesting a more urgent need to address the issue.

In response to this persistent disparity, social scientists from a variety of disciplines have developed and tested a variety of theories to understand and explain achievement outcomes, with the hope of identifying mechanisms that can be intervened upon in order to improve the trajectories of those youth who may otherwise have been on a downward course of under-achievement. While these theoretical paradigms, at first blush, seem widely disparate, upon closer examination, most can be viewed as complementary pieces of a larger, more holistic theory of the development of achievement behaviors among youth. That is, many of the broader, macro-level paradigms can be viewed as distal precursors to the increasingly narrow micro-level and individual-level paradigms that serve as the proximal precursors to achievement.

One theoretical model that both acknowledges the role of distal precursors to individual motivation and has shown promise in predicting human behavior in the context of achievement is the Expectancy-Value Model of Achievement Motivation developed by Eccles and colleagues

(1983). Although this model has been found to explain differences in achievement in many contexts, it does not appear to explain differences in achievement as a function of race, as African American children report levels of expectancy and value – the two immediately proximal precursors to achievement – that are equal to or higher than White students (Steinberg, Dornbusch & Brown, 1992; Winston, Eccles, Senior & Vida, 1997). This suggests that perhaps these two constructs are necessary but insufficient precursors to achievement-oriented behaviors, and that inclusion of a third variable may be needed to "catalyze" these intentions into actions. Specifically, I have proposed that self-regulatory strength may be an important third variable to include in the expectancy-value model, particularly when achievement tasks may be valued primarily for their utility, thus requiring one to delay gratification and draw upon reserves of self-regulatory strength in order to persist.

The goal of this dissertation was to empirically test whether inclusion of self-regulatory strength in the expectancy-value model is warranted, and, furthermore, if inclusion would account for achievement disparities by race and socioeconomic status. There are several notable and sometimes unexpected findings. First, self-regulatory strength appears to be an important antecedent of homework completion in both math and reading for all subgroups within the sample. Second, results on the nature of the interaction between self-regulatory strength and utility value remain inconclusive. Third, one of the mechanisms by which parental warmth impacts academic outcomes in both math and reading appears to be indirect, via its impact on self-regulatory strength. Fourth, despite controlling for self-regulatory strength and parental warmth, both race and poverty status remain strong predictors of homework completion for both math and reading in the expected direction, suggesting that self-regulatory strength does not mediate this relationship as expected. Fifth, consistent with previous findings (Eccles et al., 1983;

Eccles et al., 1984; Meece, Wigfield, & Eccles, 1990), expectancy appears to be more predictive of performance than value and explains a comparatively large proportion of the variability in homework completion. Finally, parent help with homework does not appear to matter for math homework, although it appears to matter for reading homework completion, but only for African American students. The implications of these findings are discussed in further detail, with emphasis on how they can be used to inform policy and intervention work where applicable. In addition, alternative explanations for unexpected results will be discussed, as well as suggestions for future research.

Self-Regulatory Strength as an Important Precursor to Homework Completion

An important contribution of this research was to identify the supporting role of self-regulatory strength as a precursor to academic effort – homework completion – concurrently with the motivational precursors expectancy and value. As evidenced by the comparatively large standardized coefficients and their robust presence in both math and reading, self-regulatory strength is clearly an important antecedent of homework completion, consistent with my hypothesis. Furthermore, given that the measure of self-regulatory capacity was general and not specific to academic contexts, the association is also consistent with the strength model of self-regulation (Baumeister, Bratslavsky, Muraven & Tice, 1998; Baumeister, 2002; Muraven & Baumeister, 2000). This suggests that perhaps efforts to increase self-regulatory capacity in students should focus on methods of increasing stamina that have been identified by these researchers including 1) fostering opportunities to *practice* self-regulation, 2) allowing for adequate periods of *rest* between activities that deplete stores of self-regulatory strength and 3) ensuring that students have adequate *nutrition* (i.e. glucose levels).

Implications for intervention. While researchers have explored the role of interventions to increase the development of self-regulation among students in academic contexts, these interventions have focused exclusively on fostering opportunities to *practice* self-regulation, such as assigning homework, and teaching self-regulatory study skills such as planning for homework completion, time management, and how to avoid distractions (e.g. Ramdass & Zimmerman, 2011). However, given that the strength model of self-regulation suggests that sustained practice of self-regulation *in the absence of adequate rest* actually reduces one's capacity to self-regulate over the long term, complementary interventions (or school-based policies) that focus on allowing children the *adequate rest* from self-regulation may be more beneficial.

There are several ways in which this focus on self-regulatory rest could be targeted in schools. The first, and perhaps most obvious, is to allow students more opportunities for substantial breaks and recess throughout the course of the school day. Indeed, consistent with the strength model of self-regulation, experimental work by Pellegrini and colleagues (e.g. Pellegrini & Smith, 1993; Pellegrini, Huberty, & Jones, 1995; Ridgway, Northup, Pellegrini, LaRue, & Hightshoe, 2003) has consistently found that attention among students improves significantly upon returning from breaks. Despite these findings, the general trend in the United States has been to continue increasing instructional time and decreasing break time (Pellegrini & Bohn, 2005).

Another way to facilitate adequate self-regulatory rest and prevent student burnout may for individual teachers to give more consideration of nightly homework loads, in addition to coordinating with other teachers across subjects to confirm that collective workloads are not overly burdensome for students. A general recommendation for the amount of homework to be

assigned is 10 minutes a night per grade in school (Cooper, Robinson, & Patall, 2006). Thus, a fourth grader could reasonably be expected to complete 40 minutes of homework each night while a high school senior could be expected to complete two hours' worth. However, 2012 survey data from the National Assessment of Educational Progress indicates that at least 17% of 9-year-olds (fourth graders) and 13% of 17-year-olds (twelfth graders) were spending more than the recommended amount of time on homework assignments each night. And notably, this question asked students how much time they were actually spending on homework without considering whether homework was being fully completed. In other words, it is possible, for example, that a student who reports only completing an hour's worth of homework may have left unfinished an additional hour's worth, underestimating an assigned two-hour workload by half.

In addition to allowing for adequate amounts of self-regulatory rest, schools should focus on ensuring students receive proper nutrition as a method of improving self-regulatory capacity. While the National School Lunch Program (NSLP) exists to address potential nutritional deficits among students – particularly those from low-income backgrounds – evidence suggests that availability alone may not be a good proxy for actual student consumption, as a substantial proportion of this food goes to waste (e.g. Cohen, Richardson, Austin, Economos & Rimm, 2013; Smith & Cunningham-Sabo, 2014).

Self Regulatory Strength as a Catalyst for Utility Value?

A theoretical distinction that I had proposed with respect to the role of self-regulatory strength in the expectancy-value model was that it would interact with utility value in such a way as to propel students to act on this motivational intention. In other words, I proposed that utility value alone may not predict homework completion, but in combination with self-regulatory strength it may explain substantially more variation in the outcome. Unfortunately, the results

appear inconsistent at best. For reading homework completion, the difference in effect between low and high utility value was negligible among students with low self-regulatory strength, whereas high utility value was associated with better outcomes than low utility value among students with high self-regulatory strength. Although this pattern is consistent with my hypothesis, the coefficient was approaching significance but not significant at the .05 level. Conversely, the interaction for math homework completion was significant at the .05 level, but the pattern was inconsistent with my hypothesis. For math homework, the difference in effect between low utility value and high utility value among students with low self-regulatory strength was fairly large, and was greater than the difference between low and high utility value among students with high self-regulatory strength, suggesting that utility value mattered more in conditions of low self-regulatory capacity.

Satisfying theoretical explanations for the pattern found for math homework remain elusive. I did not include intrinsic value in a three-way interaction, and utility value and intrinsic value were somewhat correlated (r = .20). As such, the apparent "boost" from utility value among students with comparatively low self-regulatory capacity may have been from intrinsic value rather than utility value. Since self-regulatory strength is theoretically not needed to impel action under conditions of high intrinsic value, it would not matter whether or not self-regulatory reserves were low – students that find math homework inherently enjoyable would complete it anyway. However, intrinsic value had no main effect on homework completion for either subject, bringing into questions the plausibility of this explanation.

Another possibility is simply that utility value, self-regulatory strength and/or homework completion may have been inadequately measured, thereby making it difficult to accurately capture this nuanced relationship. Future research should address this possibility by improving

upon the measures themselves in addition to utilizing more advanced study designs that capture within-person and across-situation variation of these measures. For example, rather than relying on a single item to measure utility value, it may be helpful to develop other items that can be used collectively to better assess this construct. In addition, given that the outcome variable is associated with homework completion, it would be useful to distinguish between the utility of math or reading *in general*, and instead focus on the utility of completing the *tasks* within these domains (e.g. "How useful do you find completing math homework?" as opposed to "How useful is math?").

Furthermore, it is worth noting that utility value is defined as a "means to an end" in Eccles' and colleagues' (1983) model, suggesting that tasks may not have any practical relevance, but nonetheless may still exhibit utility value in that they are prerequisites to desired goals. For instance, a psychology major who feels she will never have any practical use for understanding the concepts she is learning in an astronomy course would nonetheless likely see the utility value in doing well in that course insofar as it satisfies requirements of a future goal (i.e. the requirement to complete a science course to obtain a bachelor's degree) and also contributes to her overall GPA. The measure of utility value in this study specifically asked how *useful* math and reading are, which may not sufficiently tap into students' perceived utility value. As such, it may be useful to distinguish between *practical utility* of tasks and *prerequisite utility* of tasks in future studies. For instance, asking students "How important is it to your future educational goals to obtain a good grade in this course?" or "How important is it to your future educational goals to do well on this task?" may garner more information about the perceived utility of completing homework assignments. Because the stakes associated with prerequisite utility value may become apparent only later in the high school and college years (i.e. when grade point averages

begin to matter for future educational and occupational trajectories), exploring these questions during adolescence and early adulthood may also be necessary to elucidate the proposed interaction with self-regulatory capacity.

In a similar vein, steps can be taken to improve upon the measure of self-regulatory capacity in future studies in an effort to more sufficiently explore a possible interaction with utility value. As previously noted, multiple measures of self-regulation exist and ideally, several versions of this construct would be assessed simultaneously. This could include both parent- and child-reports of general self-control and delay of gratification in combination with more standardized and objective, task-oriented assessments.

Furthermore, using both experimental and longitudinal methods in conjunction with improved measures may be helpful in teasing apart the stability versus the malleability of the self-regulation construct, as well as the degree to which value is task-specific. This would in turn help clarify the extent to which individual acts of self-regulation in an academic context are being influenced by expectancies and values that are specific to the tasks/goals or whether they are in fact being influenced by an underlying capacity (or lack thereof) to self-regulate.

For instance, consistent with a strength model of self-regulation, if one could employ longitudinal data collection methods with a college-student sample and control for previous ability, expectancy, and value, one would expect the following results. First, there would be a positive relationship between homework effort and baseline (beginning of the semester) measures of self-regulatory strength. Second, one might find a negative relationship between homework effort and course load, measured by number of credits taken and perhaps a quantitative assessment of the difficulty of one's courses that semester. Finally, one might find a negative relationship between homework effort and time in course such that as the semester

progresses, students' capacity to self-regulate diminishes. The addition of an experimental manipulation in which a brief intervention aimed at increasing self-regulatory capacity mid-semester for half of the participants would further clarify the malleability of self-regulatory strength, improving the validity of the measure and perhaps allowing for researchers to understand how it may catalyze utility value.

In a similar vein, consistent with the idea of "prerequisite" utility value, one could simultaneously explore how the utility value of successfully completing individual tasks varies over the course of a semester using longitudinal data collection methods in which students are asked prior to each assignment and test the extent to which it is important that they do well. For instance, a student who has completed four of five assignments in the course and currently has a 97% average may not see the value in putting forth substantial effort for a final assignment, insofar as he or she has a "buffer" and can afford to lose points on said assignment and still maintain an "A" in the course.

In addition, consistent with the idea of "practical" utility value, one could experimentally manipulate the perception of the practical utility value of some tasks over the course of the semester. This could be done, for instance, by stressing in a grading rubric that an assignment can be used as a sample to include in an application portfolio, emphasizing that a skill being developed is transferrable across multiple domains, or that a skill can be included on a résumé.

Finally, in addition to the previously discussed improvements upon measures of both utility value and self-regulatory strength, the measure of homework completion used in this study was not ideal. For instance, because it was a dichotomous measure, it had limited ability to explore the wide variation in homework completion. Furthermore, because the measure of what teachers assigned as homework was not standardized, there was no way to control for

characteristics of homework that almost certainly matter for students' self-regulatory strength, expectancy, and value, such as the frequency with which homework was assigned, the level of difficulty, the length of assignments (and time with which they are associated) as well as the stakes of the assignments (e.g. What proportion of a final grade is dependent on homework completion? Is the homework graded for completion or for accuracy?). In addition, homework completion may not be an ideal measure of academic effort and, correspondingly, self-regulation, given that the effort put forth to complete assignments may be regulated by parents to some extent.

As such, future studies could better control for variation in homework assignments across individuals by using within-class samples in which students are all assigned the same homework assignments. In addition to being able to compare completion levels and grades on assignments, inclusion of a longitudinal, semester-long diary study in which students are asked to record how much time they spent on each assignment would further help researchers ascertain the level of effort being put forth by students. As was the case with utility value, exploring these questions in samples of older students than those used in this study, because homework completion is less reliant on parental monitoring at this later developmental stage, might bolster its validity as an appropriate measure of self-regulation in an academic context. Similarly, including study time and test scores as variables that can be used in parallel with homework completion may more accurately capture effort in an academic context.

Collectively, increasing the validity of the measures in addition to more accurately assessing change and consistency in these constructs over time and across experimentally-manipulated situations may allow researchers to capture the hypothesized interaction between utility value and self-regulatory strength. Furthermore, utilizing a sample of students who are

older and for whom utility value is likely to be a more salient characteristic of academic tasks than those students used in this study may help with deeper exploration of this interaction.

Parental Warmth as an Important Precursor to Youth Self-Regulation and Subsequent Achievement

Another contribution of this research was to explore how more distal factors affect child achievement, and particularly whether parental warmth would impact youth achievement indirectly via its effect on youth self-regulatory capacity. Among all of the indirect paths from parental warmth to homework completion, only the path via self-regulatory strength appeared for both math *and* reading homework, although in both models this relationship was approaching significance but not quite significant at the .05 level. Thus, my hypothesis was supported, with the caveat that the effect was small (b = .02). This result is consistent with previous research that has found that parental warmth has long-term impacts on the development of child self-regulation, controlling for previous levels of self-regulation (Colman, Hardy, Albert, Raffaelli, & Crockett, 2006). In addition, this work is consistent with the Family Stress Model (Conger, Conger & Martin, 2010), that links positive aspects of parenting to child outcomes, and identifies a more specific causal pathway by which particular parenting practices may predict particular child achievement outcomes.

However, in this study, these variables were measured simultaneously. As such, the direction of the relationship between parental warmth and youth self-regulatory strength and poor academic outcomes may not be as hypothesized. A youth's poor self-regulation and academic outcomes may *elicit* more negative parenting responses. In addition, given that parental warmth often covaries with other dimensions of parenting and other microsystem variables, future studies should examine the role of warmth concurrently with other dimensions that are

also associated with development of self-regulatory capacity, to further parse out mediating relationships between characteristics of the child's microsystem and child academic outcomes. For instance, recent work by Raver and colleagues (McCoy & Raver, 2014, Raver, McCoy, Lowenstein & Pess 2013; Sharkey, Tirado-Strayer, Papachristos & Raver 2012) suggests that the impact of household instability on child outcomes is mediated by child self-regulation. Thus, including such measures concurrently with specific parenting behaviors may help further untangle these specific within-family mechanisms.

Implications for intervention. The resulting chain of associations from parental warmth to youth self-regulatory strength and subsequent tendency to complete homework assignments tentatively suggests that interventions aimed at increasing positive parenting behaviors – and particularly expression of parental warmth – among youth exhibiting low self-regulation in school may be a beneficial way to improve their academic achievement. Several studies have found intervention programs aimed at increasing warmth and responsiveness among parents of at-risk children (i.e. those from low-income backgrounds or who may have experienced maltreatment) to be successful in terms of both increasing these positive parenting behaviors and associated positive child outcomes, although they are generally targeted toward parents of infants and young children (e.g. Hoksbergen, Riksen-Walraven & Kohnstamm, 1997; Linares, Montalto, Li, & Oza, 2006; Patteson & Barnard, 1990; Toth, Maughan, Manly, Spagnola, & Cicchetti, 2002). For older children, it may be beneficial to offer parenting workshops through the school that address not only parental warmth but additional parenting practices that are more relevant to this later stage of development including control and monitoring and communication of educational expectations (Davis-Kean, 2005). Additionally, such workshops could focus on

helping parents understand the developmental process of self-regulation, its role in achievement, and how to foster it in family and school environments.

Conversely, the ability of such workshops to improve parental warmth and other positive parenting behaviors may be limited, particularly in the context of the high-stress environments associated with poverty. To this end, interventions that focus on more distal precursors to parental warmth and subsequent child outcomes may be more appropriate. Indeed, programs exist to address these issues simultaneously, many with promising results thus far. For instance, in 2010 the Obama administration increased funding for the Maternal, Infant, and Early Childhood Home Visiting Program (MIECHV Program), which funds individual programs that include multiple weekly visits from a nurse or social worker to help pregnant and new mothers 1) address immediate concerns such as food, housing, bills and such and 2) learn about parenting best-practices and how to facilitate a positive, nurturing relationship with their children, particularly during difficult situations. Studies on individual programs in the past have shown promising short- and long-term results for children in outcomes such as increased math and reading scores and decreased mental health problems (e.g. Olds et al., 1998; Olds, Henderson, Tatelbaum & Chamberlin, 1986).

Similarly, the Harlem Children's Zone incorporates multi-level interventions aimed at helping parents address the many tangible needs that are often left unmet in populations experiencing dire poverty, while simultaneously including parenting courses to help parents understand the social science behind different disciplinary methods and the importance of fostering positive relationships with their children (Tough, 2009). In addition to intervening in the home microsystems of program participants, this particular model also aims to address their exosystem via a focus on a geographically-confined area (neighborhood) in an effort to create a

synergy in which the entirety of these interventions are thought to work multiplicatively, subsequently improving outcomes more efficiently than the sum of any of the individual interventions may do alone.

The Role of Race and Poverty Status in Explaining Differences in Homework Completion

Consistent with my hypothesis and previous research (e.g. Steinberg, Dornbusch & Brown, 1992; Winston, Eccles, Senior & Vida, 1997), initial ANOVA results indicated that African American youth and high poverty (below poverty threshold) youth had levels of expectancy and value that were equal to or greater than their European American and low poverty (above poverty threshold) counterparts. Furthermore, initial results indicated that African American and high poverty youth also exhibited lower levels of self-regulatory strength, which was also consistent with my hypothesis. However, despite controlling for self-regulatory capacity, which was hypothesized to account for differences in achievement by race and poverty status, each of these demographic variables remained strongly and stubbornly predictive of homework completion in both math and reading, as both African American youth and poor youth were less likely than their European-American and non-poor counterparts to complete their homework. In other words, differences in self-regulatory capacity do not appear to account for differences in academic effort between these groups.

A possible explanation for this finding is that African American and poor youth may have obligations outside of the academic realm, such as chores and child-care duties, demands that may require them to deplete their self-regulatory reserves on these priorities at the expense of completing homework. Indeed, research has found low-income (Dodson & Dickert, 2004) and African American youth (Jarrett, 2003) are more likely to have to take on adult roles during the school years, and that these additional responsibilities have a negative impact on achievement.

Thus, while these youth may have absolute levels of expectancy, value, and self-regulatory strength that are comparable to their higher-achieving counterparts, the strain of additional responsibilities that these youth are more likely to have may explain these group differences. To explore this possibility, future research should control for non-academic obligations as well as employ a measure of relative or comparative value similar to the Academic Delay of Gratification Scale (ADOGS; Bembenutty & Karabenick, 1998) that examines the likelihood of pursuing academic tasks in comparison to home obligations that may be competing for students' time. Additionally, diary studies could explore whether there are between-group differences in the proportion of time spent on homework and other academic endeavors in comparison to non-academic responsibilities.

Another possible explanation is that subjective assessments of self-regulatory strength given by parents may be based on frames of reference that systematically differ across groups based on structural inequalities or cultural factors. For example, what one parent views as behavioral evidence of a child's high self-regulatory capacity in a neighborhood plagued by violence and crime or in comparison to a peer group that similarly struggles academically may not be viewed as high in the context of a neighborhood in which there is very little violence and crime or compared to a high-achieving peer group. In other words, parent interpretations of self-regulatory behaviors may be relative and based on experiences limited to samples of comparison youth that do not represent sufficiently broad variation in self-regulatory capacity. This could be addressed in future research by using a more standardized assessment of self-regulatory strength such as researcher observation or objective tasks such as those developed by Baumrind and colleagues.

Finally, it has been well established that low-income and minority youth have fewer opportunities for academic enrichment and attend poorer quality schools. As noted previously in the review of determinants of achievement, this lack of opportunity may then translate into artificially depressed ability and leave at-risk students unprepared to fully grasp the concepts that are currently being taught in their classes. The lack of exposure to extra supports would put them at a comparative disadvantage insofar as they must spend more time on assignments to reach outcomes that are comparable to their more advantaged peers. In other words, they may be working harder than their more advantaged peers to make up for previously experienced deficiencies in opportunity. This additional effort may represent an unmeasured facet of the model, perhaps functioning as another strain on youths' self-regulatory capacity or as a cost that lowers overall motivation.

Expectancy as a More Important Precursor to Homework Completion than Value

Consistent with prior research that has found that expectancy is more predictive of actual achievement than value (Eccles et al., 1983; Eccles et al., 1984; Meece, Wigfield, & Eccles, 1990), results of this study indicate that expectancy is an important precursor to homework completion, particularly for math homework. Although expectancy is not significant in the model for reading homework completion, this is likely due to expectancy being strongly influenced by previous performance (Eccles, Midgley, & Adler, 1984, Stipek, 1984). In that case, the Woodcock-Johnson broad reading score is taking up more of the variation in this model.

In addition, the relationship between intrinsic value and homework completion was consistently non-significant, suggesting that even when homework is described as "interesting" or "fun", this may not be sufficiently motivating to impel effort. However, as discussed previously, these measures may not be sufficiently capturing the *relative* intrinsic value of

homework assignments compared to the broad scope of activities that may be competing for youths' time. That is, students may be comparing their interest or enjoyment of completing math assignments to their interest in social studies assignments for example, which may inflate intrinsic value scores to the extent that all homework is seen as less interesting or enjoyable than, say, watching television or hanging out with friends. Indeed, research by Leone and Richards (1989) asked students to report every two hours between 7:30pm and 9:30pm the activity in which they were currently engaging, as well as their affective and motivational state, found that students experienced more negative affect, lower motivation and lower attention during homework tasks than other activities, irrespective of their academic performance. Once again, studies that employ an additional measure that taps into comparative value such as the ADOGS (Bembenutty & Karabenick, 1998) or another measure that asks students to rank or prioritize similarly valued activities may find that homework in general is perceived to have low intrinsic value, which may explain why it does not predict homework completion.

Implications for intervention. As previously noted, expectancy is thought to be influenced by perceived competence and perceived task difficulty (Eccles et al., 1983), each of which are themselves influenced by sources such as interpretations of previous accomplishments and failures, vicarious experiences, verbal persuasion and physical and affective responses to tasks. Previous research on mindset interventions developed by Dweck and colleagues (e.g. Blackwell, Trzesniewski & Dweck, 2007; Yeager & Dweck, 2012) has focused on the role of utilizing verbal persuasion to influence perceptions of previous accomplishments (or lack thereof) and thereby increase student persistence and academic performance. Specifically, this work concludes that by teaching students that intelligence is malleable and not fixed, they can work to overcome apparent deficiencies to increase their intelligence, thus giving the students a sense of

control, or efficacy, over their ability to learn, even when faced with previous setbacks or failures. In a similar vein, Oyserman (2013) has found that using verbal persuasion in influencing perceived difficulty has a positive impact on achievement by helping students reframe difficulty as being indicative of high task value as opposed to one's low ability. Interventions aimed at reducing negative affect (e.g. test anxiety) have also been found to be effective in increasing academic achievement (Cheek, Bradley, Reynolds & Coy, 2002; Weems et al., 2009).

Collectively, this research indicates that there are several mechanisms by which expectancy can be improved among students, which can be used as critical components of more comprehensive educational interventions and supports for students. In addition, this study suggests that educational policies and interventions aimed at increasing or improving instruction may not sufficiently emphasize the promotion of learning engagement. Given the role of verbal persuasion and the influence of important others such as parents and teachers, interventions teaching these adult influences the importance of consistent use of such strategies in the classroom and at home, independent of a formal "intervention" at the school or classroom level, could also be employed to increase academic performance.

Parent Help With Homework as an Important Precursor to Homework Completion in Reading But Not Math for African American Students

Consistent with previous research that has found positive associations between parent help with homework and homework completion and performance (Balli, Demo & Wedman, 1998; Callahan, Rademacher & Hildreth, 1998), this study finds that, at least under certain circumstances, parent help with homework is associated with more homework completion. Interestingly, however, parent help with homework was a strong (b = .23), positive predictor of homework completion only within the domain of reading and only among African American

students, leaving open to question its lack of significance for either group in the math domain and for European Americans in the reading domain.

Hoover-Dempsey & Sandler (1995, 1997) identified three primary reasons that parents assist their children with homework, including belief that they should do so, belief that assistance will be associated with a positive outcome and perceived invitations to assist. Thus, one plausible explanation for why help with homework may not have been a significant predictor in the math domain is that parents may not believe they are as able to effectively assist with math homework compared to their confidence in reading homework assistance. Indeed, one survey study found that 53% of parents struggle with assisting their children with math and science homework, suggesting that parental efficacy in these domains may be comparatively low (Intel, 2009). Because parent help with homework was a global measure rather than a domain-specific measure, this could explain why the same measure was not equally predictive in both the math and reading models. Future studies should further examine whether parents feel more or less efficacious in helping their children with homework in distinct subjects.

An explanation for why parent help with homework is positively associated with reading homework completion for African American students but not European American students, however, is more elusive. In a review of research on parent help with homework, Hoover-Dempsey and colleagues (2001) note several mechanisms by which parent assistance can impact achievement, such as through modeling and supplementing teacher instruction with more individually-responsive instruction at home. Given that minority students are more likely to attend schools with environments that are characterized by comparatively more classroom disorder (Neiman, Devoe, & Chandler 2009), it is possible that the additional modeling and

supplementing of instruction at home simply matters more for those students whose school contexts do not already provide adequate opportunities for modeling and instruction.

Study Limitations

Although this study adds to our knowledge about potential factors that influence academic effort, and specifically homework completion, it is important to keep in mind that it had limitations. In addition to previously discussed limitations associated with the measures, a primary limitation is low teacher response rate, with differences in the mean scores on predictor variables. Specifically, although teacher homework reporting was *not* associated with self-regulatory capacity, it was positively associated with ability, expectancy, value, parent help with homework and parental warmth across both subjects. In addition, European-American students and students with higher income-needs ratios were more likely to have their teachers respond. In short, missingness on the outcome variable was substantial and non-random, which may bias the results.

Another limitation was that cross-sectional data were used to explore a proposed mediation model. However, because data were not collected longitudinally, direction of causality could not be determined. For example, it is plausible that consistent failure to complete one's homework influences one's expectancy to do well in a certain subject. In a similar vein, parental awareness of children's homework completion may influence parents' perceptions of their child's capacity to self-regulate. Future studies should explore these questions using cross-lagged longitudinal data or randomized controlled intervention trials in order to confirm direction of causality.

Conclusion

It is of increasing importance to the future social and economic well-being of the nation to better understand the disparities in academic achievement. Utilizing a large, nationally-representative sample with multiple-informant data, the present study used path analysis in an effort to explore how self-regulatory strength in combination with expectancy and value may explain group differences in homework effort measured by teacher report, and furthermore, how parental warmth may indirectly influence homework completion via its impact on youth self-regulatory strength.

Results provided evidence of the importance of self-regulatory strength and expectancy in explaining differences in academic effort, while simultaneously highlighting that race and poverty status also remain significant predictors despite controlling for these cognitive and behavioral precursors to academic effort and subsequent achievement. This underscores the need to continue searching for factors that explain group differences, while simultaneously utilizing what is known about motivational and behavioral precursors to create practical solutions aimed toward helping students from all backgrounds increase their academic achievement.

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